(21) 1907. I

FIFTY YEARS' REPUTATION

Hunyadi János

Natural Aperient Water

has now been prescribed by Practitioners of all countries for nearly half a century, and their unanimity concerning its supreme excellence is strikingly displayed in the emphatic verdict of approval which has been returned by Doctors the world over.

When we find men of such undisputed eminence in their several lines as *Professor Virchow; Professor Moleschott,* of Rome; *Professor von Esmarch,* of Kiel; *Professor Lombroso,* of Turin; *Dr. Chas. Fauvel,* of Paris; *Professor Fred. T. Roberts, Dr. Lewis A. Sayre,* of New York; *Professor Wm. A. Hammond,* late Surg.-Gen. of the United States Army; *Professor von Bamberger,* of Vienna; *Professor Vanlair,* of Liege, referring to HUNYADI JÁNOS in warm and even enthusiastic terms, nothing more is needed to show that, in point of medicinal qualities, it must be something quite out of the common.

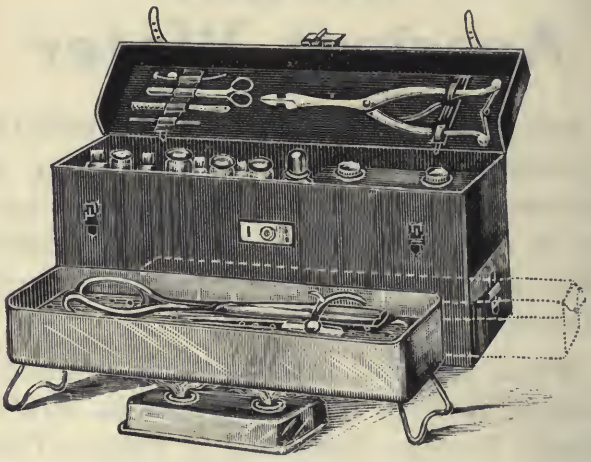
PROPRIETOR OF THE SPRINGS—

ANDREAS SAXLEHNER, BUDAPEST.

Samples and Literature Free to Medical Men on application to the
LONDON Agency: Trafalgar Buildings, Charing Cross, W.C.

Modern and Improved

MIDWIFERY BAG WITH STERILIZER.



The bag is made of solid leather having a compartment beneath into which the Sterilizer fits.

The Sterilizer has no seams, being blocked out in one piece from a solid metal sheet and heavily nickel plated.

The larger instruments are carried in Sterilizer, the top portion of the bag being reserved for Nail Brush, Lamp, Chloroform Bottle, Pill and Medicine Bottles, Dredger, leaving room for Apron, Gloves, &c.

The inside Cover has loops arranged for carrying the smaller instruments.

PRICE of the Bag, together with Sterilizer, Lamp, Nail Brush in plated case, Minim measure in case, Chloroform Bottle in plated case, Dredger, 3 Pill Bottles, 3 Medicine Bottles.

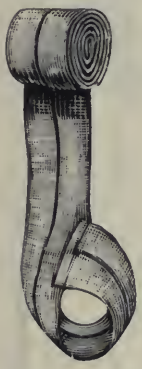
£3 3 0 net (with outside Canvas Cover 7/6 extra.)

R. SUMNER & CO., Ltd.,

SURGICAL INSTRUMENT MAKERS, LIVERPOOL.

THE "PUTTEE" LEG BANDAGE

FOR VARICOSE VEINS, etc.



THESE are elastic Bandages fitted with a loop for the foot, and fastened at the top with patent spring fasteners.

The advantage is that the bandages are quickly adjusted, and always keep in position.

They are preferable to an Elastic Stocking as they can be adapted to any required pressure, and are cooler and lighter in weight.

They require no measurements or fitting, and are only about half the price of stockings.

WE MAKE IN TWO SIZES.

To reach the Knee (9 feet by 2½ inches), 2/- each.

To reach the Thigh (13½ feet by 2½ inches), 3/- each.

SPECIAL SIZES MADE TO ORDER.

R. SUMNER & CO., LTD.,
LIVERPOOL.

STERILE SEA WATER

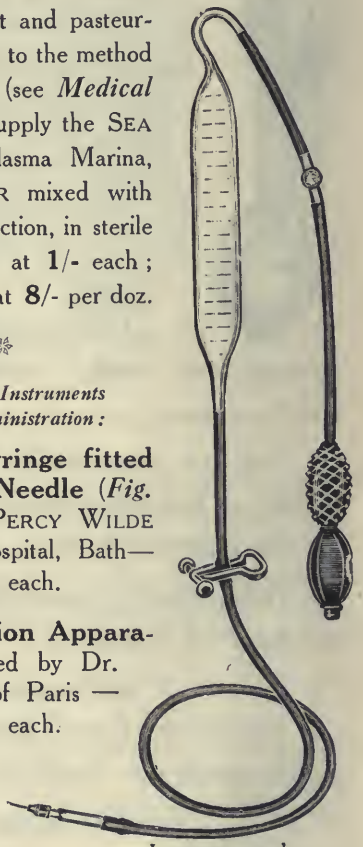
FOR INJECTION.

MESSRS. R. SUMNER & CO. LTD., LIVERPOOL,

Fig. 1.

beg to inform Members of the Medical Profession that they collect and pasteurize SEA WATER according to the method advised by Prof. SIMON (see *Medical Annual,* 1910). They supply the SEA WATER itself, or the Plasma Marina, that is the SEA WATER mixed with sterile water ready for injection, in sterile bottles of 16-oz. capacity at **1/-** each; or in ampoules of 50 c.c. at **8/-** per doz.

Fig. 2.



There are two kinds of Instruments recommended for its administration:

(1,) An **All Metal Syringe fitted with Hypodermic Needle** (*Fig.* 1), as used by Dr. PERCY WILDE at the Lansdowne Hospital, Bath—
Price - **15/-** each.

(2,) A **Glass Gravitation Apparatus** (*Fig.* 2), as used by Dr. — ROBERT SIMON, of Paris —
Price - **12/-** each.

Instrument used by Dr. Percy Wilde.

Instrument used by Dr. Robert Simon.

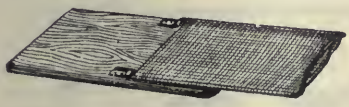
In addition to these Instruments, a **100 c.c. Measure Glass** —— will be found useful, the price of which is **1/6.** ——

R. SUMNER & Co. Ltd. LIVERPOOL

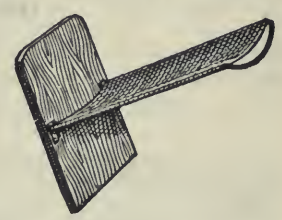
PATENT.

FOLDING LEG REST

A COMFORT AND BOON TO INVALIDS.



When CLOSED it can be packed in a trunk for travelling, thus ensuring a comfortable and easy Chair at all times.



When OPEN it is a supported Canvas trestle on which the legs rest with comfort without producing stiffness or stagnation.

TO SUFFERERS FROM GOUT, RHEUMATISM, VARICOSE VEINS, Etc., IT IS INVALUABLE.

It can be used with any kind of Chair, whether high or low, giving PERFECT EASE AND REST, enabling Convalescents to sit for hours without fatigue.

Recommended for use in Yachts, House Boats, Bungalows, Gardens, Seaside, Clubs, Hotels, Hydros, and Hospitals.

PRICE - **5/-** each, by post **5/6** each.

WHOLESALE AGENTS:

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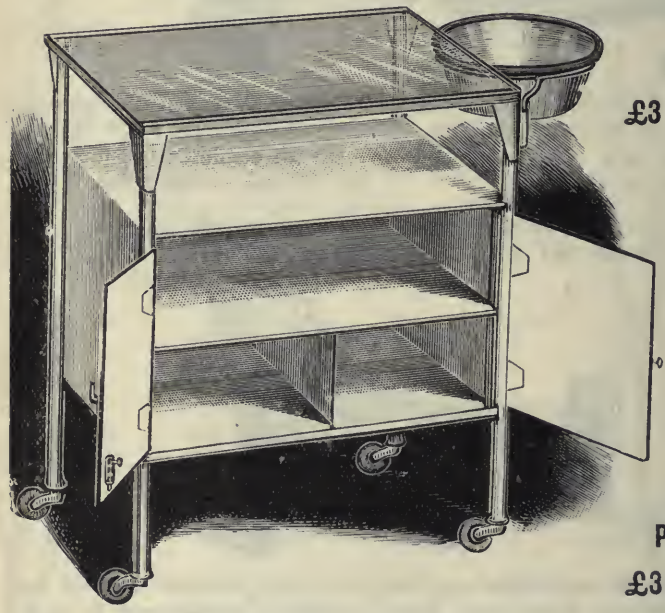
DRESSING TABLE & CABINET

(NEW MODEL.)

THIS table is made from the best cold drawn steel tubes, and japanned with white enamel in stoves at a temperature that renders the surface hard and lasting.

The price is exceedingly moderate.



PRICE
£3 3s. 0d.

Carriage paid to any Station in United Kingdom

PRICE
£3 3s. 0d.

Measurements of Table:—Height 32 in.; Width 22 in.; Depth 17 in.
Measurements of Cabinet:—Height 13 in.; Width 22 in.; Depth 17 in.

The top is plate glass, the underneath shelf and cabinet are made of metal. It is provided with a bowl for antiseptic solutions, and is mounted on rubber wheels. It is an ornamental, useful and much desired addition to any surgery or consulting room.

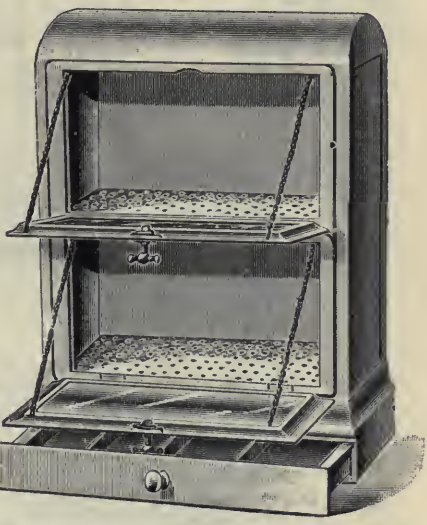
R. SUMNER & Co., Ltd.,

Surgical Instrument Makers,
LIVERPOOL.

COLLEY'S
ANTISEPTIC CABINET.

THESE are made of white enamelled iron, 20 in. high, 15 in. wide, and 8 in. deep. It consists of two compartments with perforated metal shelves, the object of the perforations being that if tablets of Formaldehyde are kept in the drawer beneath, the whole Cabinet becomes filled with the vapour, and if the instruments are sterile when put in, they will keep so. There are two fall-front glass doors which serve as shelves to place small instruments on during use. The top of the Cabinet is rounded, thus avoiding dust catching on the edges. It makes a very useful Cabinet for a medical man who is called upon frequently to attend to minor injuries.

PRICE - **£3 3s. 0d.**



ADAMSON'S IMPROVED PORTABLE
INTRAVENOUS & RECTAL SALINE INFUSION APPARATUS,
WITH NICKEL-PLATED METAL FUNNEL.

This consists of a cylindrical nickel-plated Metal Funnel. A tube of six Tablets of Sodium Chloride (60 grs.; one tablet is sufficient for a pint of solution of requisite strength.) 3 feet of I.R. Tubing, Intravenous Needle with protecting sheath and aseptic eye, Rectal Tube plugging on to plated Mount, complete in Muslinette Bag, the whole apparatus being capable of sterilization by boiling.

PRICE - - **7s. 6d.** each.

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LIVERPOOL.

R. SUMNER & Co. Ltd. LIVERPOOL

Fig. 1.

Fig. 1.
APRONS, as suggested and worn by Mr. Thelwall Thomas, of Liverpool.

Price 9/- each.

Measurements required—
Circumference at chest, and length desired.

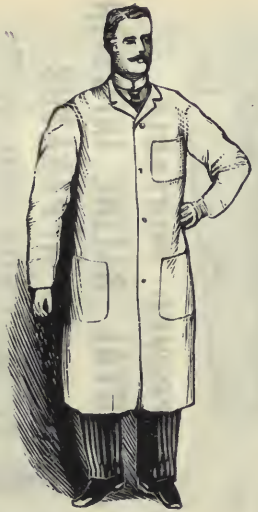


Fig. 2.

Fig. 2.
COAT, with three pockets.

Price—18/- ea.

Measurements required—
Circumference at chest, length of sleeve, and length of coat desired.

Fig. 3.

Fig. 3.
OVERALLS, with Helmets, for infectious cases.

Price— 15/- ea.

Measurements required—
Circumference round neck and chest, length of sleeve, and length of overall desired.

Muslinette Aprons and Coats for Surgeons and Accoucheurs, Overalls for Physicians in Attendance on Infectious Cases.

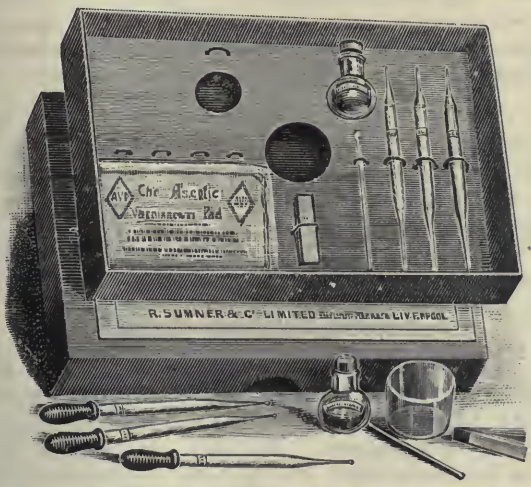
MUSLINETTE is a light waterproof material that can be washed and treated with antiseptics. It is unaffected by a temperature of 212° F., and therefore can easily be rendered aseptic.

Ready Prepared Sterile Reagents for the Preparation of Salvarsan "606" for Intra-Muscular Injection in SYPHILIS.

THESE REAGENTS ENABLE A PRACTITIONER TO PREPARE THE INJECTION AT THE BEDSIDE, WITH GREAT EASE AND SIMPLICITY.

Each Case contains two sets of Reagents, with the necessary apparatus, sufficient for two Injections.

PRICE—
5/-
per case.



Each Case contains two sets of Reagents, with the necessary apparatus, sufficient for two Injections.

PRICE—
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Fullest instructions for Preparing and Injecting given with each Case.

A 20 c.c. "RECORD" SERUM SYRINGE is considered the best for administration; the price of this with Two Needles of proper calibre is **17/6.**

SALVARSAN **"606"** in tube sufficient for One dose - **10/-** per tube.

MICHEL'S IMPROVED SUTURE SET.

THE advantage of this Set is that the Suture Clips are fixed by a slot arrangement on the extreme end of the Spring Forceps for approximating edges of wounds, so that they are in a convenient position for the operator to get hold of them with the Compression Forceps. The Case also contains a Forceps for the removal of the Suture Clips, the jaws of which are so shaped that when the clip is pressed in the centre, the two ends are raised at an angle that releases them without causing pain to the patient.

Price of the Outfit - 15/-

R. SUMNER & CO. LTD., LIVERPOOL.

CHEMICAL, BIO-CHEMICAL, BACTERIOLOGICAL

AND

PATHOLOGICAL EXAMINATIONS.

IT gives us pleasure to inform the Medical Profession, that we have made arrangements for carrying out the above work by competent investigators, who possess special knowledge of the branches involved.

The reports are rendered as promptly as the scientific nature of the enquiries permit.

We should like to emphasize the great and increasingly recognised importance of this branch of medical work; firstly, as instanced by the Bio-chemical methods of diagnosis, which show clearly its value in detecting diseases of the Alimentary System, such as for example: **DUODENAL ULCER, CANCER, PANCREATITIS** and other obscure **INTESTINAL LESIONS.**

Again, experience during the past few years has shown us that the more ordinary Bacteriological examinations, such as the examination of **SPUTUM FOR TUBERCLE BACILLI, SERUM FOR WIDAL'S REACTION,** and **THROAT SWABS FOR DIPHTHERIA,** are largely taken advantage of, and their value appreciated. We might also mention the increasing importance of the Wassermann Test, not only in diagnosis of **SYPHILIS,** but also in judging the efficiency of treatment. We shall be glad to forward on application, a further list of subjects where a diagnosis in doubtful cases, may be greatly facilitated by the application of these modern scientific laboratory methods, and the probable cost of the examinations.

We are prepared to undertake the preparation of Bacterial Vaccines from the patient's own organism. The work of Sir A. WRIGHT, and others, has now placed these on a very firm footing. Full details as to the correct method of collecting the material necessary for cultivation from any particular case will be sent on request. We may just here mention the applicability of this method of treatment to such diseases as **FURUNCULOSIS, PNEUMONIA, ACNE, CYSTITIS, GONORRHŒA, NASAL AND BRONCHIAL CATARRHS, SEPTICÆMIA, PYÆMIA,** and all chronically discharging sinuses.

We are also prepared to undertake investigations for Medico-legal purposes of a bio-chemical, bacteriological and histological character, upon conditions which may be arranged.

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(*EXTRA PHARM.*)
(For Treatment of Rheumatic Affections).

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(Effervescent in Sickness).

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(Compressed Chemicals for Solutions.)

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FULL LIST ON APPLICATION.

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SODIO-MAGNESIAN APERIENT with CAFFEINE (Martindale).
A useful combination.
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GLYCEROPHOSPH. CO.—
Original Bottles, 8 oz. fl. capacity, each 2/6

TRILACTINE TABLETS.

EXTRA PHARM. XIII., p. 845.)

Lactic Acid Bacilli for the Metchnikoff Treatment of Guaranteed Efficiency.—Original Boxes of 8 Tubes, 4/6

TRILACTINE OUTFIT.

Guaranteed for preparing Curdled Milk with above Tablets.

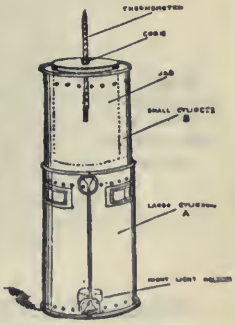
With Pint Jar, Post Free in Great Britain, 11/6
With Quart Jar in addition, post free in Great Britain, 14/-

Brochure on Lactic Acid Bacilli Treatment, by W. H. MARTINDALE, Ph.D., post free on application.

WIMPOLE INSTITUTE VACCINES—Sole Agency.

Full Price List on application.

TRILACTINE OUTFIT.



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USUAL DOSE:— 2 bonbons or tablets, for children ½-1 bonbon or tablet.

is a combination of the isovalerianic and acetyl esters of phenolphthalein. It combines the laxative and purgative properties of this drug with the valuable properties of valerianic acid as an intestinal sedative. The action of Aperitol, owing to this sedative valerian principle, is entirely free from pain. It possesses no toxic or irritant properties and hence may be administered even in cases of kidney disease. The motions are soft but not loose. Unlike most laxatives, Aperitol does not lose in efficacy by prolonged administration.

BORNYVAL

DOSE:— 1-3 Pearls two to four times daily.

is the isovalerianic acid ester of borneol. The results of experiments show that Bornyval produces marked sedative and analeptic effects in neuroses of the circulatory, digestive, and central nervous systems. It contains the recognised pharmacological properties of valerian root in a definite form, but produces no undesirable effects, and there are many references in current medical literature to its pharmacology. In all conditions where valerian is indicated, Bornyval is preferable.

GONOSAN

DOSE:— 2 capsules three or four times daily.

consists of a solution of one part of the anæsthetic Kava resin in four parts of the purest East Indian sandalwood oil. It possesses the valuable property of a specific anodyne action on the mucous membrane of the whole urinary apparatus; it also increases the quantity of urine, but reduces purulent secretions. Gonosan combines the good properties of the best of all balsams, whilst it is free from deleterious by-effects, and excels all known remedies in its strongly anæsthetic and sedative action. Owing to its strongly astringent and bactericidal properties, Gonosan prevents the spread of the disease to the posterior urethra. In this way it guards against complications.

Samples and Literature willingly supplied to the Medical Profession

The J. D. RIEDEL CO.,

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MERGAL

DOSE:—
Begin with 1 Capsule three times a day, increasing the dose to 2 capsules five to six times a day.

the mercury salt of cholic acid, meets all the requirements of an internal remedy for the treatment of syphilis. Corrosive properties are absent, and consequently the usual concomitants of intestinal lesions and their sequelæ, colic and diarrhœa, are entirely avoided. From Mergal the mercury is absorbed at a steady and uniform rate into the system; hence the preparation is well borne by all classes of patients. Mergal is most suitable for the treatment of all syphilitic conditions, in the secondary as well as in the tertiary stage.

OVOGAL

DOSE:—
1 to 3 caps. several times daily.

an albuminate of bile acid, assists the physiological activity of the hepatic cells in elaborating the bile. The bile thus artificially secreted, contains an increased proportion of biliary acids, and these exert their stimulating effect on the intestinal functions. It is therefore indicated in intestinal dyspepsia, duodenal catarrh, fatty stools, etc., and as it stimulates peristalsis it is also of valuable service in atonic constipation. Ovogal is a specific in acute and chronic affections of the liver and biliary passages, because it effects a thorough flushing of these organs.

SALIPYRIN—"SALIPYRETS"

DOSE:—
Adults 15 grs. three to six times daily; Children half the dose.

is a compound of phenazone and salicylic acid. It has been shown that Salipyrin-Riedel not only unites the therapeutic actions of salicylic acid and phenazone, but also that it is free from the deleterious action of the former upon the stomach, and of the latter upon the heart. Salipyrin-Riedel is something more than a mere arithmetical sum of its two components. Its effects are not only anti-febrile and quieting to the nervous irritation, often observed in the first stages of influenza infection, but almost anti-toxic.

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PRICES:

No. 1—7 in. by 2¼ in. **5/6,** with Air Filter, **6/6**
„ 2—9 „ „ 3 „ **7/6,** „ „ „ **8/6**

⚜ ⚜ ⚜

APPARATUS FOR THE LOCAL APPLICATION OF CARBON DIOXIDE

Fig. 1

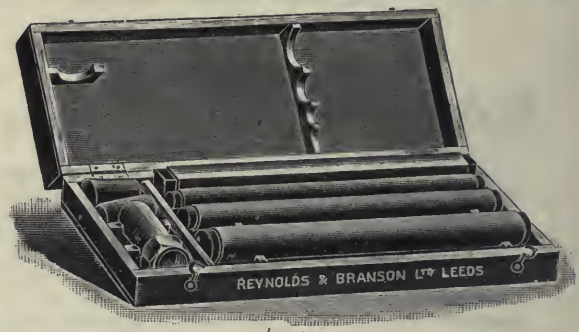

Fig. 2.

FULL DESCRIPTIVE CIRCULAR of Ebonite Moulds, &c., on application.

A New Collector, price **3/6** each *(Fig. 1)* suggested by Dr. H. E. BATEMAN, York.

Set of Brass Tubes, price **12/6** *(Fig. 2)* suggested by Dr. E. R. MORTON, London.

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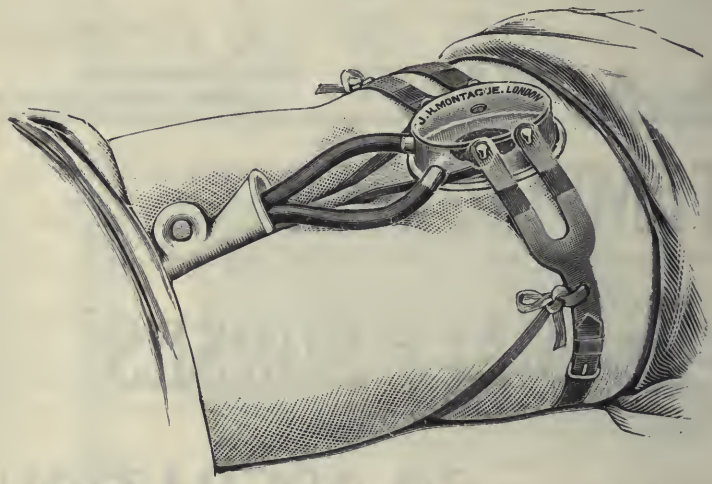
SUPRA-PUBIC
DRAINAGE APPARATUS.

Devised by Dr. HAMILTON IRVING.
Vide *The Lancet*, December 21st, 1907.



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Inhaler for Gas and Ether **£5 17s. 6d.** (without cylinders)

With Cylinders and patent combined fitting, **£9 12s. 6d.**

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. LATEST IMPROVED .

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FOR

Ether, Gas and Ether, or Ether and Ethyl Chloride.

Advantages.

No restriction to breathing.

Patient does not smell ether before an administration.

Reservoir can always be refilled whilst on the face.

Does not weigh more than an ordinary Clover.

Face-pieces cannot become detached from Reservoir when in use.

Cylinders have Barth's patent combined Stand and Union.

All fixing done by one screw.

Makes the changing of cylinders much simpler and quicker.

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APPARATUS FOR THE MANIPULATION OF CO_2 SNOW—

Designed by Mr. John Hall-Edwards, L.R.C.P., Hon. F.R.P.S. Set consisting of Two-pound Cylinder of CO_2 filled, Stand for same, Special Nipple Union, Hall-Edwards' Collector, Hall-Edwards' Applicator, Hall-Edwards' Clamp Compressor, with full directions ... ... net **£3 3s. 0d.**

Illustrations and full particulars sent on application.

ANÆSTHETIC INHALER—

The "Kirkby" Inhaler.* (Patent applied for No. 23507/10.)

Suggested by Mr. L Kirkby Thomas.

This Inhaler has many advantages over the masks now in use :—

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(2) After the anæsthetic is poured on the circle of lint, the closed fingers should be placed over the clip collar (which stands ¼ in. above the surface of the lint) to prevent the chloroform from vaporising into space.

(3) The mask is arranged so that a fresh piece of lint can be easily placed in position for each case, and the frame of the mask is shaped to give the greatest possible comfort to the patient.

(4) It will be found that the amount of anæsthetic required for this method is about 40% less than by the usual inhalers.

"Kirkby" Inhaler. Patent applied No. 23507/10. Strongly made, well plated. Each ... ... net **5s. 6d.**

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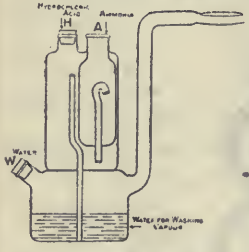

See "The British Journal of Tuberculosis," Oct., 1910, pages 282 and 283.

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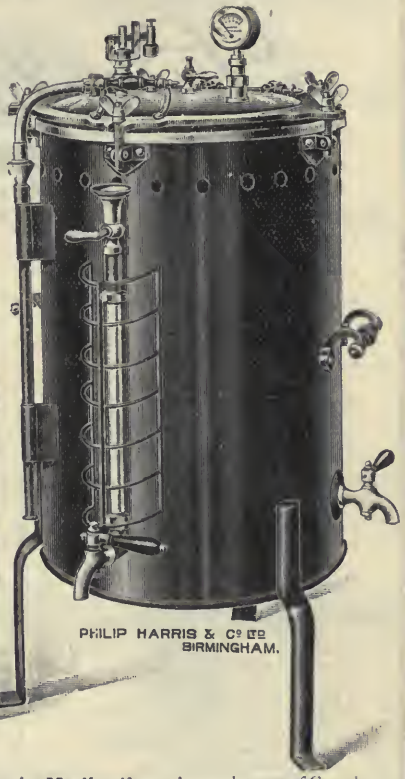

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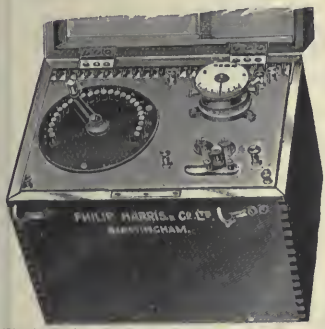

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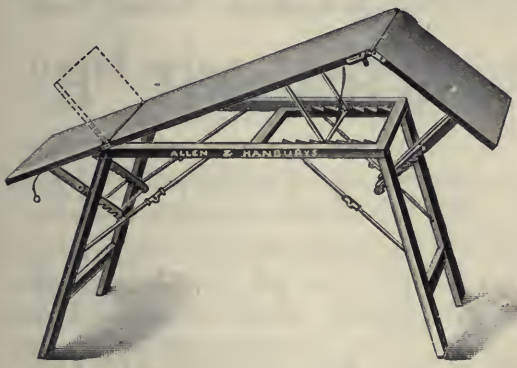

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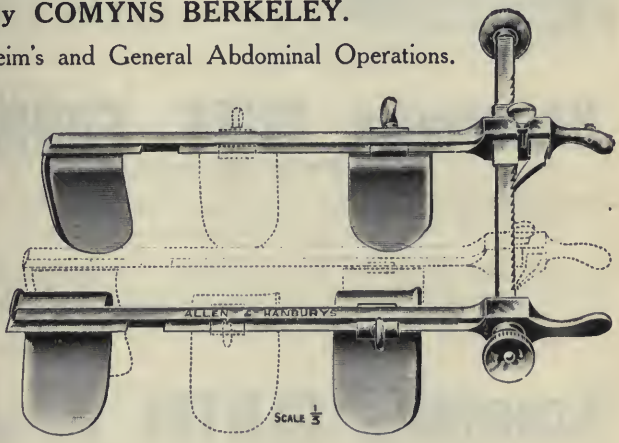

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"I am, Gentlemen, yours faithfully,
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CHILDREN in proportion.

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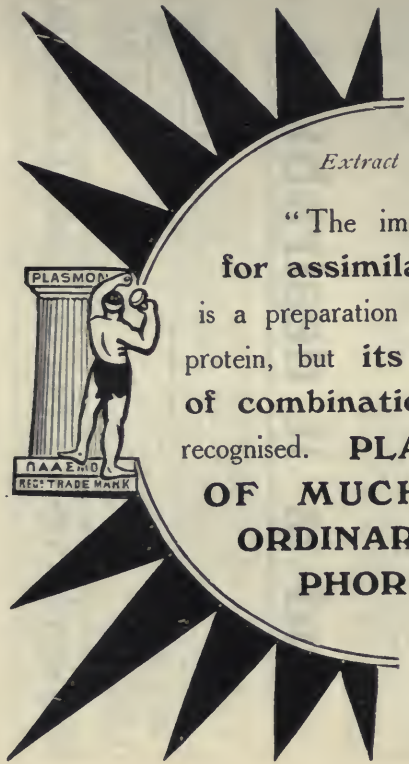

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The present day free use of tea is responsible for a considerable portion of the Digestive and Nerve Trouble which confronts the practitioner. This fact is, we believe, generally admitted: and when it is realised that last year's consumption of tea averaged 6¼ lbs. per head of the population, such result is not surprising.

natural tea

So great a hold has the Tea habit taken, that probably no medical man is there to-day who is not confronted, at times, with the problem of the patient who, forbidden to drink tea, yet yearns for its accustomed stimulus.

So far as tea is prejudicial, it is by reason of the large percentage of its tannic principle. Not generally is it realised, however, that the tannin in the tea leaf differs from that found in many other vegetables and fruits, in that it is of the cruder or gallo-tannic variety.

free from crude tannin

Few grasp the fact that this injurious gallo-tannic acid (identical with the active principle of oak bark used in tanning leather), is by the tea plant, secreted solely in the fibrous and woody portion, and that so far as the leaf is concerned, it is present only in the stem and fibre, and that in the flesh of the leaf the tannin shows in its milder and non-injurious form of simple tannic acid.

The *Lancet* it was, we believe, first pointed out (May 24, 1907) this difference in a report upon an analysis of tea. In this was shown that, although the ordinary tea of commerce contained 10% of tannin, yet that the percentage in a tea comprised only of the edges and tips of the leaf apart from the woody portion was 6·30 only. BUT the crux of the *Lancet's* report was that the tannin in whole leaf tea was found to be injurious gallo-tannic acid, whilst in the edge and tips of the leaf it was simply the mild innocuous tannic-acid.

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and is it desirable?

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"Recent researches on milk-albumin," writes Professor Dr. P. Bergell of Berlin University, "have yielded some new facts which have an important bearing on the practical feeding of infants.

"It used to be thought that the proteid in milk was one uniform chemical substance, but we now know that both human milk and cow's milk contain two different proteids: viz., Casein and an Albumin. Human milk contains a large amount of this Albumin, cow's milk contains but little." This is vividly shown in Bergell's analysis:—

	Casein.	Lactalbumin.
Human milk	·8%	·6%
Cow's milk	2·7 to 3·0%	·2 to ·3%

In diluting the cow's milk to make the casein contents correct this deficiency of Lactalbumin is made still worse.

"*Now for the first time*," *says Bergell*, "*this deficiency can be rectified, because the albumin in soluble form as it exists in natural milk, can be obtained. This soluble albumin is called Albulactin.*"

The addition of Albulactin makes diluted cow's milk form exactly the same soft, fine, easily-absorbed flakes, and behave in *exactly the same way as human milk*. It has been extensively employed at one of the chief children's hospitals in Berlin by **Prof. Dr. J. Cassel**, who has obtained the following striking results with it:

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Practically free from Carbohydrates.

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Ash	0·72 %
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That it is derived wholly from the core of a variety of wheat peculiarly rich in proteid;

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That the special process of manufacture incidentally sterilizes the pure proteid product;

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Each tablet contains 0·05 gramme (¾ grain) of iodine, and has the therapeutical effect of 5 grains of KI.

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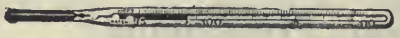

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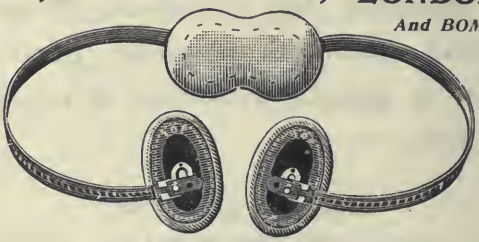

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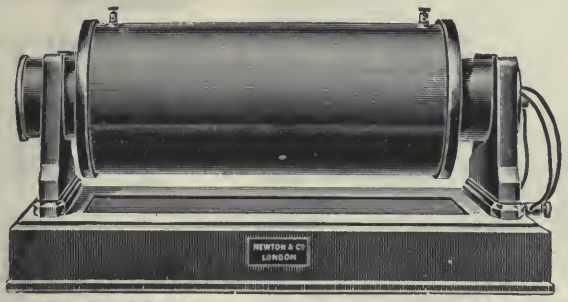

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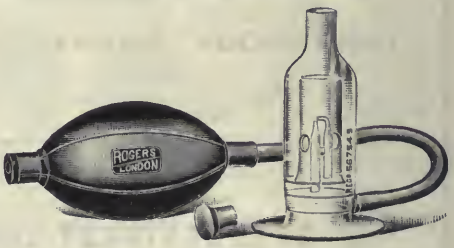

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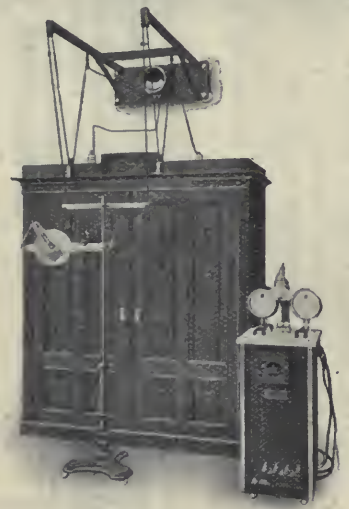

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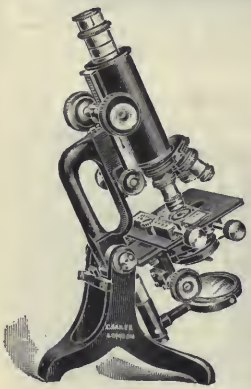

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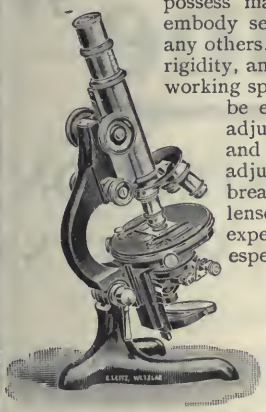

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FIG. 1.—Illustrates our New Detachable Rack (Patent applied for), for Catch forceps, such as Artery Forceps, Clamp Forceps, etc., etc.

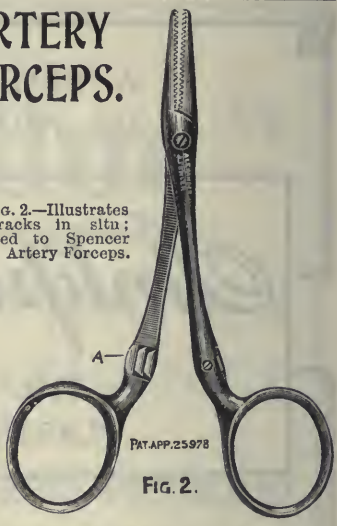

FIG. 2.—Illustrates the racks in situ; adapted to Spencer Wells Artery Forceps.

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Great saving effected in the cost of renewals.
Worn racks replaced at a small cost.
In ordinary forceps the toothed racks become worn, and cannot be replaced, and the forceps are rendered useless, therefore, in considering price, it is a question of cost of new racks, versus cost of new forceps.
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(2) The solid projection B^1 on under surface of rack A, which engages space C.
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It should be noted that when forceps are closed, the pull on racks is in a direction to draw projection B into slot C.
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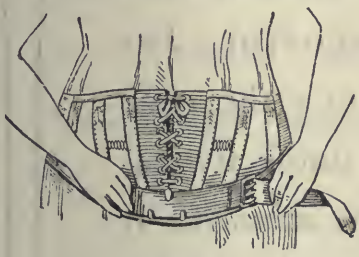

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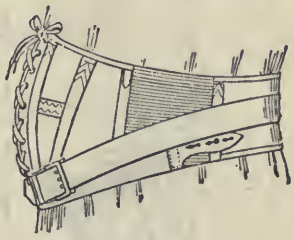

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PREFACE

This is the twenty-ninth issue of the Medical Annual, and it is edited and printed by those who were responsible for its first volume. For this we are thankful. We have watched with parental pride the growth of the book, and the increasing hold it has gained upon the affection and confidence of the medical profession in all parts of the world. But we are conscious that the result has not depended upon our own merits.

We aspired to keep the practitioner abreast of all that was new in connection with his profession. To succeed in this, it was first necessary to have the support of a sufficient body of practitioners who recognized the importance of being in touch with the latest advances of medical science. It was equally essential to have the assistance of those whose special work enabled them to supply this information.

That we have been able to find both, and bring them together, is the smaller part of the undertaking: the book is the achievement of the medical profession itself.

Not seldom, the practitioner in some remote part of the world tells us of a subject not fully dealt with; it is some specialist of world-wide reputation who then enables us to supply the deficiency. It is such friendly criticism and kindly help that enable us to meet the needs of so wide a constituency, and incidentally bring us in contact with all that is best in the Profession.

It was a subject of regret to us that our last edition was exhausted before some of our regular subscribers had remembered to order the book. Unfortunately it is impossible to reprint it.

We have made one innovation in the present volume, which we think will add to its value. We have indexed the matter in the first part of the volume which refers to Therapeutics, under the name of diseases in the Dictionary of New Treatment. This will prevent the reader missing any new remedy or particular form of treatment which has not yet found its way into general use. We propose to make this arrangement permanent.

We must again express our deep obligation to the Medical Press in all parts of the world for the generous way in which they have received our last issue.

THE EDITOR.

The "Medical Annual" Offices,
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THE MEDICAL ANNUAL

Part I.—The Dictionary of Materia Medica and Therapeutics

REVIEW OF THERAPEUTIC PROGRESS, 1910,

BY

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GENERAL REVIEW.

By far the most important event of the past year has been the introduction of "606," which by all accounts seems to be a most potent antisyphilitic remedy, exciting an almost miraculously rapid effect upon all the protean manifestations of syphilis. It is too early yet to decide whether "606" (*see* ARSENIC) actually cures the disease, but it certainly appears to be able to remove the individual symptoms much more rapidly than any of our older antisyphilitic remedies. Unless the benefit obtained is permanent, it seems probable that the pain caused by the injection of the drug will soon control its use.

Apart from "606," no striking advance falls to be noted. Perhaps the discovery of a phenolphthalein derivative which purges when administered hypodermically may prove of importance.

Lactic-acid bacilli seem to be somewhat losing in popularity. On the other hand, the widespread interest in vaccine therapy has almost completely diverted the interest of investigators and clinicians from serum therapy. It is to be hoped that the eventual outcome of so much work will prove of more clinical value than the meagre results obtained from the investigation of serum therapy.

DICTIONARY OF REMEDIES.

ADRENALIN.

Dissatisfied with the poor therapeutic results obtained with sprays and laryngeal injections, Ephraim[1] suggests endobronchial local treatment in **Asthma** and **Chronic Bronchitis.** Using a flexible catheter introduced through the bronchoscope, he sprays into the

affected bronchus a 1–10,000 solution of suprarenin, to which he adds, if necessary, 1–200 novocain. Apart from the introduction of the bronchoscope, the procedure is painless, and the actual spraying is not disturbing to the patient. The therapeutic effect in asthma seems to have been very good. The immediate action consists in the cutting short of an attack, but the first night shows no improvement. In a few (twelve to twenty-four) hours, a profuse, easy expectoration is set up and, with this, relief from the attack is obtained. The most striking effect, however, is the permanence of the relief. Out of the 68 cases the after-history is known of 53. In 21 a single spraying was followed by permanent relief of at least two months' duration. In other 14 of the cases the spraying had to be repeated once or twice before the permanent relief was obtained. In 6 other cases a lasting improvement was obtained, in 5 the trouble returned after a few weeks, while in the remaining 7 cases no effect was obtained. Of 19 cases of bronchitis, 5 failed to react, but in the remaining 14 great benefit was obtained. In from three to twelve hours profuse, easy expectoration set in, with rapid subsidence of the catarrhal symptoms.

The question whether adrenalin has any action on the pulmonary blood-vessels has been differently answered by those who have investigated it. The most recent writer, Farini,[2] as the result of perfusion experiments, finds that adrenalin acts in the same way on the pulmonary circulation as on the systemic, but the action is less intense. The vasoconstriction is not preceded by any vasodilatation. The pulmonary constriction is less quickly produced, and a dilution inactive for the pulmonary vessels will still produce a characteristic constriction in the systemic vessels.

Léon Bernard[3] reports an interesting case of well-marked chronic **Osteomalacia** which improved greatly under prolonged treatment with subcutaneous injections of adrenalin. At first 1 cc. of 1–1000 solution was injected subcutaneously every second day. Distinct benefit was apparent after thirty injections. After three months' treatment the injections were stopped during menstruation, as the periods had become too profuse. A good clinical cure was obtained after about a hundred injections had been given. Bernard claims that in this particular case the morbid process was arrested, the bones were healed, the deformities removed, and the general health restored. The individual injections caused little disturbance except for a tingling palpitation, which came on in about fifteen minutes and lasted about two hours. Adrenalin seems to have been used in thirty-five cases of osteomalacia. The therapeutical result is not constant, but twenty of these cases were either cured or ameliorated by the treatment. This inconstant action is possibly due to the fact that the osteomalacic syndrome is not always due to the same cause, and it is only in certain cases that the adrenalin removes or neutralizes the cause of the symptoms.

Intramuscular and intravenous administration of adrenalin preparations have been advocated in severe cardiac embarrassment. The treat-

ment is not without a certain element of risk, as the two fatalities[4] following intramuscular injection clearly show. In discussing the whole question of this use of adrenalin, John[5] reports another case in which death followed immediately after an intravenous injection. This writer seems to have used adrenalin in about thirty cases of extreme **Cardiac Distress.** In some cases the therapeutic result was astonishing, but the individual response varies. The immediate blanching of the skin and mucous membranes is startling. In addition there is sometimes sickness, but he has never seen glycosuria after intravenous injection. He summarizes his views regarding the use of adrenalin as follows: In severe cardiac failure or collapse where other restoratives fail, suprarenin intravenous injections are indicated. The dose required is from 0·2 to 1 cc. of the 1–1000 solution, which can be given undiluted, since the suggested dilution with nine parts of saline solution has no benefit. It is useless to employ other stimulants after the injection, but the suprarenin may be repeated if required in from four to six hours, or at longer intervals. Apparently it is only in cases of cirrhotic kidney that there is any risk of the injection causing death.

REFERENCES.—[1]*Berl. klin. Woch.* July 4 and 11, 1910; [2]*Gaz. deg. Osped.* Aug. 2, 1910; [3]*Presse Méd.* Nov. 20, 1909; [4]*Centr. f. Gyn.* 1909, No. 25; [5]*Münch. med. Woch.* Nov. 23, 1909.

ALCOHOL.

During the past year several investigators have again devoted attention to the vexed question of the action of alcohol as a stimulant. Most of the recent writers seem to have been impressed with the view that the use of a general anæsthetic, or such a crude method of procedure as destroying the cerebral hemispheres, is not suitable for such experiments. Consequently, several have attempted to use the intact unanæsthetized animal. Thus Clive Brooks[1] has devised a special trocar cannula, which can be introduced into the carotid artery and enables him to obtain a manometric blood-pressure tracing without anæsthetizing the animal. The alcohol was administered in three different ways: (1) By direct introduction into the stomach through a gastric fistula; (2) Directly into a superficial vein; or (3) By pouring the alcohol through a rubber tube introduced into the buccal cavity.

The primary action of alcohol varies according to the mode of administration. By the mouth it causes a marked rise in blood-pressure, with increased amplitude and a constant, or slightly slowed, rhythm of heart-beat. This rise gradually passes off in five or ten minutes. In some instances, at the time of pouring the alcohol into the dog's throat, and just preceding the rise mentioned, there is a sudden drop and almost immediate recovery of blood-pressure. When administered intravenously, alcohol causes a sharp drop in blood-pressure, during which the heart is greatly slowed or almost stopped; but very soon, unless the dose is too large, there follows a rapid recovery. By gastric fistula there is no specific primary action. By whatever method administered, alcohol, when circulating in the blood-stream, causes a gradual,

progressive lowering of blood-pressure, with decrease in amplitude but increase in rate of heart-beat. This Brooks regards as the true pharmacological action of alcohol on the blood-pressure of the intact unanæsthetized animal.

Alexandroff[2] has attempted to produce artificially in animals a condition resembling the clinical states in which alcohol is used as a cardiac stimulant. With this object she treated her rabbits with diphtheritic toxin, which in the course of thirty-six to forty hours produces a condition of failing heart with distinct degenerative changes (parenchymatous swelling, fatty degeneration). The lethal dose of the toxin employed was 0·03 gram per kilo, and as a rule Alexandroff injected slightly less, usually from 0·02 to 0·025 gram per kilo body-weight. In another series of investigations the animals were reduced to a state of exhaustion by injection of sufficient strychnine to keep the animals for six or seven hours in a state of continuous reflex muscular spasm, followed by fasting for twenty-four hours. Finally, in a third series of tests, the animals were infected with an infusion of rotten hay. The alcohol was given diluted with Ringer's solution as an injection into one of the veins of the ear. The individual dose was 1 cc. of a 20 per cent solution, which was repeated every five to seven minutes till 6 cc. in all had been given. The experiments showed that, thus administered, alcohol had uniformly a deleterious influence upon the circulation, though the respiration was more or less stimulated. Thus, in the diphtheria series, though the rate of the respiration was not influenced, the individual respirations were more ample, so that more air was expired. In the diphtheria experiments the pulse-rate was not affected, but the blood-pressure and the amplitude of the beat were reduced, while the amount of blood passing in a given unit of time was smaller. At the end of the injections the blood-pressure had fallen 14·7 per cent. In the other conditions, the blood-pressure and pulse-rate were similarly adversely affected by the alcohol, while the respiratory stimulation was less marked and more transient.

In some experiments upon the action of alcohol on the human circulation in febrile conditions, Dennig, Hindelaye, and Grünbaum[3] were unable to detect any marked stimulant action. Even in small doses, alcohol reduced the minimum and maximum pressure as well as the amplitude of the pulse. In uræmic conditions the effect is different, and these values are raised. As the result of their investigations they recommend that alcohol should be more sparingly used in febrile conditions.

Parkinson[4] has done some interesting work on the relation of alcohol to immunity. He found that the addition of small quantities of absolute alcohol to a saline suspension of human blood did not produce any influence upon phagocytosis till the proportion of alcohol reached 1–8. Injected into rabbits, small (non-toxic) quantities of alcohol raise the opsonic index against staphylococci. The effect is temporary, lasting about twenty-four hours, but passing off within three days. With a larger toxic dose the index falls for a few hours, but recovers

within twenty-four hours. The effects of chronic alcoholism are more marked. Even though no manifest toxic symptoms were produced, the continuous daily injection of alcohol produced a marked lowering of the opsonic index, both for staphylococcus and tubercle bacillus. The deleterious influence of chronic alcoholism was also shown by the lessened response to inoculations of dead germs, the index not rising so high as in control animals. Though the alcoholized animal does not respond to large doses of vaccine with such a marked negative phase, the succeeding positive phase is also less marked than in the control animal. With injections of living germs the deleterious influence of alcohol is also well marked. The alcoholized animal shows a greater negative and a lessened positive response. The conclusion is that small doses of alcohol temporarily reduce the opsonic index, while continuous moderate doses cause a permanent lowering of it; the reacting mechanisms involved in the production of antibodies, as tested by the opsonic response, is rendered less effective in the alcoholized animal than in the normal animal.

A novel method of administering alcohol by inhalation was suggested by Willcox and Collingwood at the British Medical Association meeting in 1910. Passing a current of oxygen through absolute alcohol results in a definite absorption of alcohol vapour. They use a wash-bottle fitted with an inlet and outlet, into which absolute alcohol is introduced, and the gas is allowed to bubble briskly through the inlet tube inserted half an inch or so below the surface of the alcohol. They consider that the alcohol vapour is absorbed by the lung and carried directly to the heart, where it acts as a powerful stimulant; and they recommend the inhalations in **Angina Pectoris,** and **Cardiac Failure** in pneumonia, dilated heart, valvular disease, infectious conditions, etc. The inhalation is used for three to five minutes every half hour in severe cases of cardiac failure; it slows the heart by ten to twenty beats, and makes the pulse fuller and stronger. It is, they say, pleasant to take.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* July 30, 1910; [2]*Cor.-blat. f. Schweiz. Aertze,* May 20, 1910; [3]*Arch. f. klin. Med.* 1909, Bd. 96; [4]*Lancet,* Nov. 27, 1909.

ALUM.

Boggs[1] recommends alum baths as a means of diminishing the risk of **Skin Complications** in typhoid fever. He makes a solution of approximately 1–1000 by dissolving 1 lb. of alum in a little hot water, and adding it to a "tub" of cold water. The ordinary care of the skin is maintained, but he calculates that the additional protection afforded by the alum practically reduces the incidence of skin complications by one-half.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* June 22, 1910.

ALUMINIUM SILICATE.

Neutralon, a soluble aluminium silicate, is highly recommended by Alexander[1] in **Disordered Secretion of the Gastric Hydrochloric Acid.** The action of the drug is slowly obtained, as it combines with the

HCl, forming silicic acid and aluminium chloride. As prepared by Kahlbaum, of Berlin, neutralon is a white tasteless powder, insoluble in water, which slowly splits up in the presence of dilute hydrochloric acid. In therapeutic doses the drug forms a protective layer adhering to the gastric mucous membrane, which is gradually split up by the prolonged action of the hydrochloric acid, both the silicic acid and unchanged neutralon remaining adherent to the mucous membrane, while the soluble aluminium chloride exerts an astringent, antiseptic action. In the case of gastric ulceration the neutralon adherent to the ulcer is probably not split up at all, owing to the destruction of the acid-secreting glands by the ulceration process. The acid-binding power of neutralon is considerable, and Alexander calculates that in the course of several hours the therapeutic dose (1 teaspoonful) is able to bind about 400 cc. of 0·2 per cent HCl at the temperature of the body. He has used neutralon in a series of ninety-two cases, administering for the first few days one teaspoonful, and later half this quantity, fifteen to thirty minutes before food. In eighteen cases of **Gastric Ulcer** the results were most evident in those cases where there was bleeding; in eight out of nine cases with hæmorrhage a cure was obtained, but five of the nine cases without bleeding were not improved. In the cases that improved, the pain passed off in three to five days, and the tenderness on pressure was gone in about nine to twelve days. The largest proportion of his cases consisted of patients suffering from **Hyperchlorhydria.** Of fifty-four cases, twelve did not do well, but in the remaining forty-two cases a remarkably rapid improvement was obtained. The subjective symptoms—pain, nausea, and tendency to vomit—first disappear. The examination of the gastric contents usually showed, after eight to ten days' treatment, that the total acidity was slightly reduced, while the amount of free HCl was markedly diminished. A further series of twenty-three cases of simple hypersecretion treated with neutralon gave excellent results, only four remaining unimproved, but the hypersecretion does not yield so quickly as the hyperacidity. The author concludes that neutralon constitutes a real advance, and is likely to prove of distinct value as an addition to our dietetic and local treatment of gastric conditions.

Rosenheim and Ehrmann[2] found neutralon valuable in **Hyperæsthesia** of the stomach in chlorosis and anæmic states. In gastric ulcer the drugs rapidly relieved the acid irritation, but did not seem to cause such prompt healing as bismuth.

REFERENCES.—[1]*Berl. klin. Woch.* Dec. 6, 1909; [2]*Deut. med. Woch.* 1910, No. 3.

AMENYL.

This substance, methylhydrastinimide, is an addition-product of hydrastin. It is stated to possess a vasodilating action, and on this account has been introduced by Falk[1] as an **Emmenagogue.** He tested it in a series of forty-eight cases, and obtained a successful result in nineteen (40 per cent). The cases were of an unfavourable type, and in many instances had already received prolonged treatment with

other drugs without any benefit. The results were most successful in purely functional amenorrhœa, and least success was obtained where diseases of the uterus or ovaries had destroyed the functions of these organs. Unpleasant side-actions were rarely observed. In one instance slight headache was produced. In other cases, even where menstruation did not appear, the accompanying disturbances at the time of the periods was diminished. The drug does not appear to possess abortifacient properties, but should be given with caution where there is any suspicion of pregnancy, as in some cases it caused slight bleeding and pain in pregnant women. The dose is one tablet of 0·05 amenyl twice daily. The price of the drug is very considerable.

REFERENCE.—[1]*Ther. Monats.* Jahr 23, No. 11.]

AMIDO-AZOTOLUOL.

Last year attention was drawn to the stimulating effect exerted by scarlet red upon the growth of epithelium on **Granulating Surfaces.** One of the disadvantages of the drug consisted in its active staining properties, which often lead to unpleasant marking of clothes and bed-linen. Scarlet red is amido-azotoluol-azo-β-naphthol, which is closely allied chemically to ortho-amido-azotoluol. The staining properties of this substance are very slight, while it possesses all the stimulating influence of scarlet red upon epithelial growth. Hayward[1] states that amido-azotoluol is a reddish-brown powder, soluble in fatty oils, alcohol, and ether, but insoluble in water. Clinically it is as effective as scarlet red. He applies an 8 per cent ointment every second day, an indifferent boric-acid ointment being substituted on the intervening day. Similarly, Katz[2] has abandoned scarlet red for the newer drug, as he finds it devoid of staining properties, while it acts even more promptly as a stimulant to epithelial formation. The wounded area must be covered with perfectly clean healthy granulations before using the drug. If the wound is still secreting, the application of the drug simply intensifies the secretions. He dissolves it in olive oil and then incorporates the solution with enough vaseline to make an 8 per cent ointment. Unlike most new remedies, this one is very cheap. According to Katz, it is an excellent remedy for the treatment of granulating wounds, which become rapidly covered with epithelium turning into and forming durable skin. For small wounds the ointment need not be changed for two or three days, but with larger ones it is well to change it daily, and apply every third day an indifferent ointment of lanolin or boric acid. To prevent any eczematous irritation of the sound skin, the ointment dressing should be applied only to the wound.

REFERENCES. — [1]*Münch. med. Woch.* 1909, No. 36; [2]*Deut. med. Woch.* Sept. 8, 1910.

ANÆSTHETICS, CUTANEOUS.

Rendle Short and Salisbury[1] have investigated the anæsthetic action on the unbroken skin of those preparations in the British Pharmacopœia which are supposed to have this property. They

tested the following preparations: lin. belladonnæ, empl. belladonnæ, ung. belladonnæ, ung. atropinæ, ung. gallæ cum opio, lin. opii, empl. opii, lin. aconiti, ung. aconitini, ung. cocainæ. The effect of the drugs was tested on the unbroken skin of the finger and on the mucous membrane of the mouth. None of the drugs exerted any influence, when applied to the unbroken skin, on the pain sense tested by either (1) The intolerable temperature sense; i.e., at what temperature water became too hot to hold the finger in for half a minute; or (2) The faradic pain sense; i.e., the point at which the damp finger first found electrical stimulation to a faradic coil actually painful. The pinprick test was used to confirm, in a general way, the findings of these two more accurate tests. Other finger tests employed were the thermal discrimination test, power of detecting minute differences in temperature, and the tactile sense. For the tongue, the tests were the faradic pain sense, the thermal discrimination test, and the appreciation of taste and touch. As none of the drugs investigated had any anæsthetic action on the unbroken skin, they conclude that it is useless to paint or rub them on the skin for the relief of pain. Consequently they advise replacing such local applications of opium, belladonna, cocaine, aconite, and menthol in the treatment of bruises, thrombosis, inflammation, or neuralgia, by other more efficacious means, such as rest, massage, and counter-irritation Even on the tongue the anæsthetic effect of the drugs was doubtful, with the exception of cocaine. Menthol applied to the skin produced the well-known cold sensation, but did not depress the pain sensation in any way.

REFERENCE.—[1]*Brit. Med. Jour.* Mar. 5, 1910.

ANTIDIPHTHERITIC SERUM.

Fernandez[1] states that he has had good results from the injection of this serum in various non-diphtheritic **Diseases of the Eye.** Suppurative keratitis cures rapidly, and it has also proved satisfactory in other suppurative conditions of the eye.

REFERENCE.—[1]*Med. Rec.* Nov. 6, 1909.

ANTIFERMENT TREATMENT.

MacEwan[1] has been favourably impressed with the results obtained by him in the treatment of a series of **Acute Abscesses** with antifermantin (an antitrypsin fluid obtained by treating animals with pancreas trypsin). The principle of the treatment is this. In acute abscesses an albumin-digesting ferment is present, probably obtained from the leucocytes or pus cells. This ferment is the cause of the liquefaction of the tissue, and is antagonized by an antiferment present in normal serum and in transudation fluids. The serum of the lower animals contains but little antiferment, but after treatment with trypsin a satisfactory antiferment is obtained, and is supplied by Merck as antifermantin. MacEwan's practice consisted in aspirating the abscess and washing out the cavity with antifermantin, some of which is allowed to remain. According to the size of the abscess

the quantity left in varied from 2 to 15 cc. The abscess may also be laid open, and irrigated or packed with the antifermantin. In any case the further destruction of tissue is minimized, and the discharge soon ceases. In the aspirated cases the healing was more rapid than under ordinary treatment, and prevents visible scarring. In MacEwan's successful series the patients were mostly adults and children, but Klotz[2] found the method not so satisfactory in the acute abscesses of infants. In a small series of twenty cases he twice met with fatal results, the local process being converted into a generalized infection. The antifermantin treatment proved negative in two cases of otitis media, in suppuration of the navel, in two cases of slight conjunctivitis, and in an empyema. On the whole, Klotz does not recommend the application of the antiferment treatment to acute suppurative processes of infants.

Hesse's[3] experiences with a series of twenty-six cases treated on antiferment lines was slightly more favourable. He does not believe much in the injection of antiferment bodies (either ascitic fluid or antifermantin) into closed abscess cavities, though this is sometimes useful, e.g., in bursitis. On the other hand, he thinks that laying open the abscess and packing with gauze soaked with antiferment fluid possibly does good by interfering with the splitting up of albuminous bodies and reducing the absorption of toxins.

References.—[1]*Brit. Med. Jour.* Jan. 22, 1910; [2]*Berl. klin. Woch.* Oct. 18, 1909; [3]*Langenbeck's Archiv.* Bd. 92, H. 1, in *Wien. klin. Woch.* Sept. 8, 1910.

ANTIMONY.

Many attempts have been made to utilize antimony compounds in the treatment of **Trypanosomiasis.** Quite a number of the substances tested have a more or less well-marked trypanocidal action, but nearly all appear to exert a toxic action upon the tissues of the host, and many of the preparations are unsuitable for hypodermic injection. Rowntree and Abel[1] have prepared a new compound of antimony, the triamide of antimony thioglycollic acid $Sb\langle^{S.CH_2CONH_2}_{S.CH_2CONH_2}_{S.CH_2CONH_2}$, which seems to be an advance upon the older antimony preparations, as it is found to be well adapted for subcutaneous or intravenous administration. They also investigated the trypanocidal action of sodium antimony thioglycollate $Sb\langle^{S.CH_2COONa}_{S.CH_2COO.}$ They found that both these preparations are efficacious in the treatment of experimental trypanosomiasis of rats, dogs, and rabbits. As with all known trypanocidal remedies, these antimony preparations act most effectively the earlier they are used after infection; the longer the interval between infection and the institution of treatment, the smaller the degree of success. In rats, prophylactic injections twenty-four hours before inoculation of trypanosomes proved of no value, but the injection of either of the two anti-

mony remedies at the time of the inoculation of the trypanosomes afforded complete protection. The thioglycollate injected within the first twenty-four hours after inoculation also gave complete protection. If the treatment is delayed for forty-eight hours the blood shows numerous trypanosomes, but they disappear completely within a couple of hours of administering either of the drugs; relapses, however, almost always occur unless the drugs are repeated, though such intermittent treatment keeps the majority of the animals alive for months. The drugs seem also very active even if treatment is delayed till the end of the third day, by which time the blood is swarming with trypanosomes and the animals are apparently moribund. Even in these cases intermittent treatment keeps the rats alive for long periods. Dogs do not do so well, as they are much more susceptible to the antimony preparation, and often develop toxic symptoms; but the rabbit stands the antimonials much better, and the therapeutic possibilities are greater. A donkey suffering from trypanosomiasis was treated with intravenous injections of the thioglycollate and lived for eight weeks. Each injection removed the parasites from the blood, but the animal eventually succumbed to an extra large dose of the antimony. An important point about the antimony preparations is that the parasites show little tendency to develop a strain resistant to the antimony preparation, contrasting in this respect with atoxyl and other arsenic preparations. The writers consider that their results in experimental trypanosomiasis compare so favourably with those obtained by the use of other trypanocidal drugs, that they believe that a trial of the antimony thioglycollates is justified on human trypanosomiasis.

Reference.—[1]*Jour. Pharmacol. and Exp. Therap*, Oct. 1910.

ANTISEPTICS, INTESTINAL.

Heineberg and Bachmann[1] have investigated the effect of several of the ordinary intestinal antiseptics on the digestion of albumin by pepsin *in vitro*. The drugs tested were benzoic, boric, and salicylic acids, beta-naphthol, creosote, phenol, resorcinol, sodium phenolsulphon, sodium sulphite, and thymol. The drugs all interfered with peptic digestion under the conditions of the experiment. The most active in retarding digestion were beta-naphthol, salicylic acid, sodium sulphite, and thymol, while the least active were boric acid and resorcinol.

Reference.—[1]*Jour. Amer. Med. Assoc.* Oct. 30, 1909.

APOCYNUM CANNABINUM.

Graham[1] has investigated the pharmacological action of this drug. The effect on the frog's heart is as follows: At first the beat is slowed, but the amplitude is increased; subsequently the rate is increased, and the action becomes irregular, with a tendency for the heart to be arrested in systole. The principal action on the heart consists in a raising of the tonus of the muscle without depression of the nerve-

endings. The blood-pressure is raised by constriction of the vessels and by an increased cardiac output. Though the drug is but slightly diuretic in health, it acts as a diuretic in diseased conditions where the heart is failing, as it improves the circulation through the kidneys. He found that the reputed active principle, a glucoside, apocynin, is less toxic than an alcoholic tincture of the crude drug.

Contrasted with other drugs which act upon the heart, apocynum is more toxic on the frog heart than digitalis, but less so than strophanthus. Of the three, it is the one most apt to produce delirium cordis. It is at the same time the most energetic vasoconstrictor of the group, producing a more immediate and sudden rise of blood-pressure than either digitalis or squill. All the drugs act only as indirect diuretics, but apocynum seems to be the most irritating and the most likely to produce hæmaturia. It is also irritating to mucous membranes, and in large doses it produces hæmorrhagic areas and ulceration.

REFERENCE.—[1]*Biochem. Jour.* Nov. 10, 1909, in *Lancet*, Jan. 1, 1910.

ARSACETIN.

Iversen[1] used arsacetin injections in a series of 104 cases of **Recurrent Fever** with great success. In 52 per cent of the cases no second paroxysm developed, while in a further 20 per cent, after a protracted apyretic interval (thirteen to twenty-one days) a rudimentary attack lasting from twelve to thirty hours develops, in which, however, it is rarely possible to demonstrate spirilla in the blood. Third paroxysms are rarely seen. He used a 20 per cent solution previously warmed. At first a quantity = 0·2 gram arsacetin is used every two to four days, which is later raised to half a gram, and treatment lasts from twenty to twenty-five days. The therapeutic action is very marked; both subjective and objective symptoms improve very rapidly, and the whole character of the disease is changed, so that 70 per cent of the cases may be treated as out-patients. He has also used larger doses at longer intervals, but there is some danger with this. With the smaller doses toxic disturbance is uncommon. In a few cases the patients suffered from colic and redness of the throat, with difficulty in swallowing. A most serious after-effect was occasionally observed, consisting in general weakness, associated with anorexia and apathy. This lasted from one to two weeks, and seemed most likely to occur when the patients were suffering, in addition to the recurrent fever, from such chronic ailments as arteriosclerosis, phthisis, or nephritis. In many cases the patients showed albuminuria after large doses of arsacetin. Iversen's theory is that this albuminuria is not due to a direct action upon the kidneys, but is really the result of the setting free of a very large quantity of endotoxin through the destruction *en masse* of an enormous quantity of spirilla. In favour of this view he points out that the albuminuria is chiefly seen during the first paroxysms, and is rarely observed during apyretic periods or in the less severe second attacks. In one case the patient became

blind after receiving an initial dose of 0·7 gram, followed seven days later by a second dose of 0·5 gram arsacetin. He notes that in a few cases the spirilla apparently became immune to the drug.

In another case treated with four doses of 0·6 gram arsacetin, Judin[2] experienced the same disaster, the blindness becoming complete within three weeks. In another case, reported by Hamme,[3] the blindness came on after the use of eight injections of 0·1 gram each.

Alexander[4] has insisted upon the danger of damaging the kidney by the use of arsacetin. In a small, carefully observed series of syphilitic cases, he noted evidence of renal irritation in every case (albuminuria, hyaline and epithelial casts). These symptoms come on early—within twelve hours—and may thus readily be missed. Some patients respond to each fresh injection with renal irritation, while others acquire a certain immunity. In his series he had to give up the drug in five out of ten cases on account of toxic symptoms, either gastrointestinal or renal. In one case he noted great restlessness, wild excitement, and loss of memory. None of his patients showed any trace of eye troubles. While insisting upon the marked tendency of arsacetin to produce toxic symptoms, he acknowledges that the drug gives extraordinarily brilliant therapeutic results in some **Syphilitic Cases** which have proved refractory to mercury and iodides.

REFERENCES.—[1]*Munch. med. Woch.* Aug. 31, 1910; [2]*Woch. f. Ther. d. Aug.* in *Merck's Ann. Rep.* 1910, p. 121; [3]*Deut. med. Woch.* 1910, No. 6; [4]*Münch. med. Woch.* Feb. 22, 1910.

ARSENIC, ARYLARSONATES.

Van Someren[1] discusses various methods of treatment of **Sleeping Sickness** tested at Kyetume Camp, Uganda. As regards organic arsenical bodies, all seem to do good in early stages of the disease, acting as trypanofuges which banish the trypanosomes from the glands and blood. This action is in most cases temporary. It is not a real trypanocidal action, as the parasites reappear and the patients may die from typical sleeping-sickness while undergoing treatment. As regards the toxic action of the various compounds, he states that kharsin is so toxic that it is unsuitable for human use. Atoxyl he finds less stable than some of the others, and the quality of the samples varied. He considers soamin the best form of organic arsenic. In doses up to 1 gram it has not caused toxic symptoms, and it is the drug used in the routine treatment at the camp. Orsudan and arsacetin he has had little experience with, but with both eye symptoms have been reported after their use. He thinks the best results are obtained from giving soamin and mercury. Mercury by itself is of little value, but the simultaneous use of soamin and mercury is more successful, though the later results are somewhat disappointing. The two drugs can be given in one injection; a clear solution is obtained if the sodium chloride used to dissolve the sublimate is added in slight excess. With regard to the dosage of the arylarsonates, he advocates giving the maximum quantity of arsenic in the first dose, as the parasite

seems to acquire an immunity to the drug. The use of small doses of atoxyl continuously is troublesome, and of absolutely no use in avoiding eye symptoms, etc., if the drug is impure ; if it is pure, no symptoms follow even large doses.

The fact that all these organic arsenic preparations are dangerous is gradually becoming more generally recognized. A correspondence in the *British Medical Journal* showed that the toxic eye symptoms must be fairly numerous. Lane[2] had one case of blindness after the use of orsudan, and knew of three cases of blindness after the use of soamin. To this Colonel Lambkin[3] replied that of 308 cases treated at the Military Hospital, Rochester, with various arylarsonates, not one had developed any toxic symptoms. He suggested that possibly the technique might be faulty, but this was denied by Lane and other writers,[4] who pointed out that Lambkin's patients were probably young adults. The suggestion is therefore made that great care should be exercised in examining the kidney, eyes, and arteries, before subjecting the patient to arylarsonate injections. Further, the full doses should not be given to any patient getting up in years, and precautions should also be taken to grade the dose according to the weight of the patient. These precautionary measures were advocated by Clarke,[5] who reported two cases of optic atrophy from the use of arylarsonates in syphilis. He states that he is doubtful if it is ever safe to give the arylarsonates to patients over forty years of age.

Pritchard[6] reports a case of **General Paralysis of the Insane** which improved remarkably under soamin treatment. There was no history of syphilis, but after a period of overwork the patient began to deteriorate mentally in September, 1908. After various treatment he was sent home from South Africa, arriving in June, 1909. He made no improvement during the first ten weeks, after which he was put on soamin. For the first two weeks 1 gr. was injected into the gluteal muscles every two or three days, but then the dose was raised to 5 gr., and the improvement was so rapid that in about seven weeks from the commencement of the soamin treatment the patient was able to return to South Africa.

Johnston[7] records two cases of **Cerebrospinal Fever** which recovered under intravenous injections of soamin. The dose was at first 3 gr., which was given into the median basilic vein on Aug. 4th, 5th, and 9th, and then on the 10th, 11th, 12th, 14th, 16th, 18th and 20th, 4 gr. were injected. In the second case, eight injections of 4 gr. were used. Both patients improved very rapidly under the treatment. Lundie and Blaikie[8] have also used soamin injections in a number of cases of **Phthisis** and other chronic conditions. Their experiences are not very satisfactory. They note, in contradistinction to most other writers, that the injections caused local pain, coming on about twelve hours afterwards and lasting for several hours. In addition, there may be gastrointestinal disturbance, nausea, colic, and vomiting. Among the cases in which they found soamin useless were cancer, pemphigus foliaceus, rheumatoid arthritis, chronic asthma, and tabes.

Out of a series of fifteen cases of phthisis, in four the results were marked. Though the cases were all in an advanced stage of the disease, a very distinct and remarkable stimulus in the direction of improvement was noted. Though the injections are in no sense a cure for tuberculosis, they seem sometimes to do good, both by improving appetite and ameliorating the physical signs; but from the clinical reports the improvement does not seem to be permanent. That the drug is not without danger is seen from the fact that one of their cases suffering from pemphigus foliaceus became blind from optic atrophy after receiving in all 450 gr. in nine courses of 50 gr. each. (Each course consisted of 10 gr. twice weekly till 50 gr. had been administered, after which there was an interval of ten to fourteen days before a further course of 50 gr. was given).

Wilson Parry[9] reports a case of **Trophoneurotic Anæmia,** following a severe nervous shock over a year before. Under soamin injections a steady improvement was obtained.

REFERENCES.—[1]*Brit. Med. Jour.* Jan. 22, 1910; [2]*Ibid.* Mar. 5, 1910; [3]*Ibid.* Mar. 12, 1910; [4]*Ibid.*; [5]*Ibid.* June 25, 1910; [6]*Ibid.* Jan. 22, 1910; [7]*Ibid*; [8]*Ibid*; [9]*Lancet.* Nov. 6, 1909.

"606."

For a number of years Ehrlich has been investigating arsenical compounds in the hope that he may discover a body able to kill off invading germs, without at the same time harming the tissues of the patient. This task is obviously no easy one. The drug sought for must be powerfully parasitotropic, while at the same time but feebly organotropic. Of the numerous drugs investigated by Ehrlich, only a few were sufficiently promising to warrant him submitting them for clinical testing in human beings. Atoxyl, arsacetin, and arsenophenylglycin represent successive stages of progress; but on extensive clinical trial all these drugs are found to be by no means devoid of action on the tissues of the host, and both atoxyl and arsacetin are capable of producing permanent damage to the nervous system.

Undeterred by many failures, Ehrlich has perseveringly continued his investigations, and in the latter part of 1909 he brought forward a new preparation, which has achieved a greater measure of success than the former compounds. The new compound, dioxydiamidoarsenobenzol ($C_{12}H_{12}N_2O_2As_2$), was discovered by Bertheim and worked up by Hata, his Japanese assistant. Accordingly, in Germany it is often called the Hata-body, but in this country is chiefly known under the fantastic title of "606," as it is said to be the 606th body investigated by Ehrlich. For medicinal purposes the drug is supplied in sterile, sealed ampoules containing the drug in the form of the hydrochloride of the disodium compound.

Unfortunately the drug is difficult to administer. It is necessary to give it either subcutaneously or intravenously, as it is not efficacious when administered by the mouth or rectum. It has been found a difficult matter to prepare a non-irritating solution which can be injected without producing undue pain. Various procedures have

been suggested. In most cases a certain quantity of pure methyl alcohol is used to assist solution, and the drug is given either as an acid or as an alkaline solution. Fraenkel and Grouven[1] dissolve the yellow powder in 1 cc. of chemically pure methyl alcohol, add a little distilled sterilized water, shake well, and then bring up the product to 10 cc. with more distilled water. The acid solution is very painful, and alkaline solutions are mostly employed. Care should be taken to use as little alkali as possible. Blaschko[2] recommends using only the minimum quantity of soda necessary to liberate the base.

Hoppe and Schreiber[3] have used the following solution for intravenous injections in 120 cases, and claim that the results are quicker and better than with intramuscular injections. Into a graduated stoppered glass measure of 200 cc. capacity, put 10 to 20 cc. of sterile water, then add 0·3 to 0·5 gram of the drug and 5 to 6 drops of methyl alcohol. Shake thoroughly till a clear solution is obtained, then add 1 cc. of normal NaOH for each 0·1 gram of the drug. Finally, bring up the quantity to 180 cc. by the addition of sterile 0·8 per cent saline solution. The whole is thoroughly shaken till a clear solution is obtained, if necessary a few more drops of NaOH being added. According to Eitner[4] the alkaline solutions, though less painful, are apt to cause trouble, as the needles are easily blocked. The original dose recommended was from 0·3 to 0·5 gram, but experience has shown that the former dose is too small, and for robust individuals most authorities prefer to give 0·5 to 0·6 gram. For women and weakly patients, 0·4 to 0·45 gram may be given, and for a child of two, 0·05 gram is sufficient.

Ehrlich's preliminary investigations showed that the drug possessed extraordinary therapeutic activity against the spirillosis of fowls, and in the experimental syphilis of rabbits. Subsequently other investigators demonstrated similar efficacy in the experimental syphilis of other animals—monkeys, geese, guinea-pigs, dogs, etc. The toxicity of the drug is very slight. Monkeys can survive the dose of 0·16 gram per kilo body-weight.

After such satisfactory preliminary animal tests, Ehrlich felt justified in administering the drug to human beings. The task was entrusted in September, 1909, to Alt,[5] who had already worked with arsenophenylglycin. The new drug proved to be very active. In general paralytic and tabetic patients it increased the number of white blood corpuscles, altered the lecethin metabolism, and markedly improved the clinical manifestations in general paresis, while at the same time the reaction of Wassermann was weakened or even abolished.

The excretion of the drug was studied by Fisher and Hoppe.[6] After injection the arsenic is slowly excreted, chiefly by the urine, but to some extent also by the bowel, differing in the latter respect from atoxyl and arsacetin, but resembling arsenophenylglycin. After intravenous injection the excretion is more rapid than after intramuscular injection. When the kidneys are healthy, arsenic is not found in the urine after five days, but in general paralytics the urine

contains arsenic for about ten days. Arsenic is still detectable in the fæces after it has disappeared from the urine. Evidently the arsenic is not all removed from the body, as post-mortem examination of two patients who died fourteen and thirty-five days respectively after an intramuscular injection still showed an appreciable deposit of arsenic at the site of injection, but the tissues elsewhere did not contain any arsenic. The drug seems to disappear from the blood about the same time as from the urine and fæces. It could not be detected in blood drawn fourteen days after an injection, but was still present two days after an injection, when it seemed to be chiefly combined with the lecethin, as the remainder of the blood contained distinctly less arsenic.

The next stage consisted in testing the new drug in cases of recent syphilis. This was done by Alt and Hoppe, who treated fifty cases under Schreiber in Magdeburg. They were able to report wonderful results in their communication to the Medical Society in Magdeburg on March 3rd, 1910. Shortly afterwards Schreiber and Hoppe[7] were able to bring to the notice of the Medical Congress at Wiesbaden and of the Medical Society of Göttingen, very successful results in both old and recent cases of syphilis.

After these satisfactory preliminaries, Ehrlich supplied the drug for trial to many hospitals, and soon a constant stream of enthusiastic testimony began to appear. At a great meeting of the Berlin Medical Society, held on June 22nd, and attended by nearly 600 medical men, a series of papers testifying to the usefulness of the drug in all types of syphilis was communicated by Wechselmann, Michaelis, Alt, Schreiber, Kromayer, and Tomasczewski. Later, similar testimony was published from all parts by Treupel[8] (Frankfurt), Pick,[9] Dörr, and Pal (Vienna), Hoffmann[10] (Bonn), Braendle and Clingestein[11] (Breslau), Glück[12] (Sarajavo), Fraenkel and Grouven[1] (Frankfurt), Zeissl[13] and Eitner[4] (Vienna), Junkermann[14] (Dortmund), Blaschko[2] (Berlin), Bohac and Sobotka.[15] The universal praise accorded by so many competent clinicians shows that the new drug constitutes a distinct advance in the treatment of syphilis. It is, of course, too early to come to any true judgment of its therapeutic value, but it is evident that it possesses to a remarkable extent the power of clearing up syphilitic manifestations at all stages of the disease. Many cases are recorded in which a single dose has healed such intractable lesions as widespread ulceration and gummatous formation in the skin and mucous membranes, and affections of the bones and periosteum, even though they may have resisted prolonged treatment with KI and Hg. The action on early manifestations also seems to be rapid. The primary lesions are said to be changed within forty-eight hours into granulating surfaces and to heal rapidly. A macular rash may disappear in a few hours. Though small papular syphilides take a little longer, they yield much more quickly than to mercurial treatment. Excoriated and ulcerated papules on the genital regions heal up in a few days, but infiltrations take longer. In congenital syphilis, even with extensive skin involvement, good results have been seen (Pick,

Wechselmann, Michaelis), while Taege[16] states that he has seen a favourable effect produced in the child through the milk of the mother after treatment with "606."

The extraordinary rapidity with which the drug acts in the primary and early secondary stages of syphilis, is well illustrated by Zeissl's statement that within fourteen days the working man is able to go back to his work less dangerous than after three or four months' treatment with the old remedies.

It is therefore already quite clear that "606" surpasses all other remedies in the rapidity with which it affects individual symptoms at every stage of the disease. Whether this is a permanent cure or merely an improvement is not so easily decided. The effect on Wassermann's reaction seems very variable. The proportion of cases in which a positive reaction becomes negative is estimated at 10 per cent by Neisser and at 90 per cent by Schreiber. Lange[17] thinks that the reaction nearly always becomes negative within four weeks, and that the time taken to disappear depends on the original strength of the reaction. Pick, Loeb, Braendle and Clingestein, and Blaschko, on the other hand, report cases showing very slight effect upon the Wassermann reaction. In a number of instances relapses have appeared within a short time of treatment (cf. cases by Neisser, Hoffmann, Géronne and Huggenberg, Braendle and Clingestein). Time alone will prove whether, in the majority of cases, a definite cure was obtained.

A third question remains to be discussed, viz.: What are the risks associated with the use of the drug? The unfortunate experiences with the arylarsonates showed that very serious damage could be produced on the nervous system. In this respect "606" seems to be much superior to the arylarsonates. Even when given by mistake in optic neuritis, no damage has resulted, and Glück, Treupel, Zeissl, etc., have used it with success in other ocular manifestations of syphilis, as keratitis and iritis. The drug seems generally well borne. In a few cases some disturbance of the urinary organs has been observed, with retention, slight albuminuria and intestinal colic. According to Ehrlich these urinary symptoms may possibly be due to the use of impure methyl alcohol to dissolve the drug, but Bohac and Sobotka[18] cannot accept this improbable explanation for their cases. In a few instances disturbance of the circulation has been noted, e.g., increase of blood-pressure and rapid pulse-rate lasting for several days, collapse, etc. More commonly a sharp rise of temperature follows the injection, and is often associated with a rash on the skin, usually of an erythematous, but sometimes of an urticarial nature. An immediate local erythema round the injected area, followed later by an erythematous reaction zone round the skin lesions elsewhere on the body, has been described by Jarisch and Herxheimer.

It may be said that none of these after-effects are serious enough to prohibit the use of the drug. The immediate pain of the injection, which is often excessive and associated with febrile disturbance, sometimes persists for a long time, and painful infiltrations often develop.

In a very few instances the administration of the drug has been followed by the death of the patient. According to Ehrlich's information this unfortunate fatality occurred on five occasions out of the first 3000 cases.

As far as our present knowledge goes, we may say that in "606" we have a remedy which acts much more quickly than any other known drug in clearing up the cutaneous manifestations of syphilis. In most cases it is able to effect this alone, but in a very small proportion of cases it is necessary to combine "606" with some form of mercurial treatment. We cannot yet say whether the drug ever really cures syphilis, i.e., eradicates it from the system; certainly in a proportion of cases the disease appears again. The extreme rapidity of the therapeutic action will render the drug a cosmetic remedy of great value in the early stages of syphilis. According to Blaschko, the absolute indications for the use of the drug are: (1) Where relapse occurs shortly after a mercurial course; (2) When, despite repeated mercurial treatment, the disease is constantly breaking out; (3) In serious forms of syphilis where mercury has failed; (4) In fresh cases of syphilis with a primary lesion, before the outbreak of the secondary eruption. In such cases the primary lesion should be excised or destroyed by the cautery in the attempt to abort the disease. Of course the drug may be used in many other conditions, and at every stage of the disease. The rapid action indicates its use in the case of a syphilitic woman becoming pregnant. Theoretically, by cutting short the disease there should be more chance of preventing abortion.

Apart from syphilis, the drug has proved very useful in relapsing fever, in which Iversen[19] states that it acts as a specific, absolutely cutting short the disease. (*See also* SYPHILIS.)

REFERENCES.—[1]*Münch. med. Woch.* 1910, No. 34; [2]*Berl. klin. Woch.* 1910, No. 35; [3]*Ibid.* Aug. 1, 1910; [4]*Wien. Med. Klin.* 1910, No. 34; [5]*Münch. med. Woch.* 1910, No. 11; [6]*Ibid.* July 19, 1910; [7]*Deut. med. Woch.* 1910, No. 17; [8]*Ibid.* 1910, No. 30; [9]*Wien. klin. Woch.* 1910, No. 33; [10]*Med. klin.* 1910, No. 33; [11]*Ibid.* 1910, No. 34; [12]*Münch. med. Woch.* 1910, No. 31; [13]*Wien. med. Woch.* 1910, No. 34; [14]*Med. klin.* 1910, No. 35; [15]*Wien. klin. Woch.* 1910, No. 30; [16]*Münch. med. Woch.* Aug. 16, 1910; [17]*Berl. klin. Woch.* 1910. No. 28; [18]*Wien. klin. Woch.* 1910, No. 34; [19]*Münch. Med. Woch.* 1910, No. 15.

ARSENTRIFERRIN.

Teubert[1] warmly recommends this preparation, a mixture of arsenparanucleinate of iron and iron paranucleinate, as a most useful method of combining arsenic and iron. It is readily taken, does not upset the stomach, and is absorbed. He uses it in poor health after illnesses, in anæmia, chlorosis, skin diseases, and affections of the lymphatic system, and singles out, as specially effective, the action as a powerful **Tonic** and **Restorative** in functional nervous affections, as neurasthenia, hysteria, and chorea.

REFERENCE.—[1]*Berl. klin. Woch.* July 11, 1910.

ASCITIC FLUID.

Audiebert and Monges[1] suggest the auto-serotherapy of ascites. Some of the patient's own ascitic fluid is withdrawn and injected into the subcutaneous tissue. This procedure is painless, causes no local reaction, and does not induce a febrile reaction. The chief therapeutic result is polyuria, but the urinary excretion of chlorides and urea is not affected. The dose at first may be put at 3 cc., but this can be raised to 10 cc.

Leary and Hastings[2] advocate the use of ascitic fluid in the treatment of **Marasmic Bottle-fed Children.** The fluid is obtained from cases of mechanical obstruction of the hepatic circulation—alcoholic cirrhosis, or in cardiac disease. They state that the fluid is non-toxic. It contains the same salts as the blood in organic combination with human proteids, which are readily absorbed, possibly unchanged. It is a human saline solution isotonic with the blood serum, and contains large quantities of complement and antibodies which prevent the growth of pathogenic organisms. The theory of its action seems to be based on the work of Wassermann, who showed that in bottle-fed children the antibodies produced are used up in transforming the cow's albumin of the food into the human albumin of the infant, so that it can be assimilated. Human albumin of breast milk can pass unchanged from the intestine into the circulation, leaving the ferments free to act upon invading germs. In such marasmic conditions, partial feeding with breast milk, in quantities too small to be of value as food, is followed by prompt improvement, probably owing to the ferments or proferments furnished in the milk. The clinical observations of Hastings indicate that the difficulty of obtaining wet-nurse treatment may be overcome by the use of injections of ascitic fluid into the subcutaneous fat or into the muscles. This procedure was followed by good results in the small series of cases recorded. There was no failure of absorption, no local or general disturbance. The dose administered was usually 1 dr. daily, but larger quantities may be given.

REFERENCES.—[1]*Presse Méd.* Feb. 2, 1910; [2]*Bost. Med. and Surg. Jour.* Aug. 18, 1910.

ASUROL.

This is the name given to a new preparation, a double salt of mercuric salicylate and amido-oxy-iso-butyrate of sodium. It is soluble, contains 40·3 per cent of mercury, does not precipitate albumin, and consequently does not produce any local thickenings at the site of injection. It is readily absorbed, and appears to possess an energetic action, which, however, is possibly not very permanent. Consequently, Neisser recommends that it should be combined with injections of grey oil. The asurol will exert a rapid action, while the grey-oil deposit, which is slowly used up, enables one to maintain a prolonged mercurial action.[1]

REFERENCE.—[1]*Ther. Monats.* Dec. 1909.

ATROPINE.

Waugh[1] has attempted to discover what clinical evidence there is that atropine acts as a **Hæmostatic.** For this purpose he advertised in journals going to 100,000 physicians for reports on atropine as a hæmostatic. Without giving details of his replies, he states that all the reports of cases in which it was used were favourable, testifying to the prompt and powerful action of the drug in controlling every form of hæmorrhage to which human beings are liable, with the solitary exception of that due to opening a large artery. Thus several cases were reported where atropine failed to check hæmorrhage from an erosion occurring during typhoid intestinal ulceration, or in rapidly advancing pulmonary disease ; but it succeeded in active and passive, arterial and capillary, traumatic and hæmophilic forms of bleeding, and that with a promptness and completeness that left nothing to be desired. The hæmostatic action is obtained under full doses, with the development of toxic symptoms : dry mouth, flushed face, and dilated pupil. Among the successful cases reported are several instances of hæmorrhage in placenta prævia, post-partum hæmorrhage, menorrhagia, metrorrhagia, hæmophilia, and hæmatemesis.

Fleischmann[2] finds that defibrinated rabbit blood is able to deprive atropine of some of its pharmacological properties. It thus removes the vagus depressant action, but does not affect the mydriatic principle. This detoxicating action is obtained only with rabbit blood, not with that of other animals examined, and is absent in rabbits which are suffering from goitre, so that it seems in some way to be associated with the thyroid gland.

Auer[3] points out that the immediate fatal anaphylaxis which comes on in previously sensitized guinea-pigs on injecting a second dose of horse serum is due to a contraction of the bronchial muscles which prevents air passing out of the lungs. The animals succumb to asphyxia, and post mortem the lungs are found to be greatly distended. Auer finds that atropine, by paralyzing the muscles in question, is able to prevent or remove the anaphylactic symptoms. By prophylactic injections of atropine he was able to save eighteen out of twenty-five animals, whereas only six survived out of twenty-four controls which did not have atropine.

References.—[1]*Med. Rec.* Nov. 27, 1909 ; [2]*Arch. f. exper. Path. u. Pharm.* June 7, 1910 ; [3]*Amer. Jour. Physiolog.* Sept. 1, 1910.

BENZOATE OF SODIUM.

Lucas,[1] while carrying out a series of observations with sodium benzoate, noticed that the drug was more apt to cause gastric disturbance when administered in acid vegetable or soup preparations than when given in neutral or alkaline media. This fact was, of course, well known, and depends upon the liberation of free benzoic acid, which is irritating. Lucas investigated the relative action of sodium benzoate and benzoic acid as preservatives for foods and fluids, and confirms the observations of former writers that benzoate of soda is relatively

a weak preservative in neutral or alkaline media, whereas it is about ten times as powerful a preservative in acid media. Clinically he finds that the sodium salt is apt to cause gastric irritation if taken on an empty stomach and under conditions favouring the flow of gastric juice. All this is, of course, exactly analogous to what is known about salicylic acid and salicylate of sodium.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Mar. 5, 1910.

BLOOD TRANSFUSION.

The utility of direct transfusion of human blood has been demonstrated by the work done by Crile and Beebe. Crile has shown that the operation can be successfully carried out, the blood being taken from a peripheral artery of the donor and directly inserted into a vein of the patient. The chief value of such transfusions lies in the treatment of acute hæmorrhage, and in this condition it can almost entirely remove the risk of shock. In other blood diseases—pernicious anæmia, toxæmia, leukæmia, acute hyperthyroidism, uræmia, and carcinoma—it has been of no service, but in tuberculosis and chronic infections it has a certain value, and in human sarcoma there is some evidence that it may be of use. This summary of Crile's views is borne out by Hartwell's[1] experience of thirteen transfusions carried out in eight patients. Unlike Crile, he had considerable difficulty with the technique of the transfusion, which in several attempts was only partially successful. Of the eight cases, the only real permanent cure was obtained in a woman who was admitted in a bloodless condition due to a ruptured ectopic pregnancy. In this case, the transfusion enabled the operation to be performed without trouble. As the result of the twenty minutes' transfusion the Hb rose from 39 to 62 per cent. In two other cases transfusion was successfully employed before radical operations for malignant disease, and as a result the operative procedure was easily performed. No therapeutic result was obtained in a case of osteosarcoma of the femur, but in a case of pernicious anæmia, marked though temporary improvement followed each transfusion. In three cases of severe sepsis, though the immediate effect was satisfactory, the benefit was transient. All the septic cases were very severe forms of intoxication, and at the time of the transfusion were in a hopeless stage of the disease.

Cole and Winthrop[2] report eleven cases in which they used transfusion in pellagra.

REFERENCES.—[1]*Med. Rec.* June 11, 1910; [2]*Jour. Amer. Med. Assoc.* Mar. 22, 1910.

BOERHAAVIA DIFFUSA.

This is a common Indian plant which is advocated by Sanskrit writers on medicine as a remedy for **Dropsy.** Basu[1] has investigated the action of a succus made by expressing the fresh juice of the whole plant. It is preserved by the addition of a little alcohol. The dose of the succus is one ounce three to six times a day. It acted well in

œdema due to parenchymatous nephritis, rapidly increasing the quantity of urine and diminishing the proportion of albumin. It did not act so well in the dropsy of cirrhotic livers, and in cardiac dropsy the results were uncertain and inferior to those obtained with digitalis. It had no perceptible effect on the pulse.

REFERENCE.—[1]*Ind. Med. Gaz.* Ap. 1910.

BROMGLIDINE.

This organic form of bromine contains the bromine combined with a form of lecethin albumin obtained from wheat. It is supplied in the form of tablets each containing 0·05 gram Br. Altvater[1] has subjected the preparation to a thorough clinical test, with the following results. The dose varied from one to eighteen tablets daily. It appeared to have no action on the pulse or urine. After a single dose the bromine is rapidly excreted in the urine, a trace being still obtained after eight hours, but with continued administration it appears that more bromine is absorbed than is excreted in the urine, so that bromine retention is probable. Tested on eleven cases of **Epilepsy,** the result is said to have been favourable in seven, but it was chiefly valuable in slighter cases of the disease. In adults affected with epilepsy of some years' standing the drug gave no better results than alkaline bromides. It is possibly an advantageous form to administer bromine to young epileptics who have not long been afflicted with the disease, as it is better taken than the ordinary bromides. Apart from its value in slighter forms of epilepsy, he found it of service in neurasthenia, hysteria, and similar functional diseases of the central nervous system.

REFERENCE.—[1]*Münch. med. Woch.* Sept. 7, 1909.

BROMOFORM.

Waterhouse[1] finds bromoform one of the best remedies in **Whooping-Cough,** especially in diminishing the number and violence of the paroxysms and in checking vomiting, while he is struck with the rarity of bronchial and pulmonary complications while using the drug. Unfortunately, bromoform is not an easy drug to prescribe. Owing to its weight and slight solubility in water, it is likely to sink to the bottom of the bottle, and thus there is danger that the last dose of the bottle may be over-strong and produce poisonous symptoms, as happened in one case to Waterhouse. The risk of this is not entirely avoided by emulsifying the bromoform with tincture of senega. Probably the safest plan is to use pure bromoform, and let the prescribed number of drops of bromoform be dropped each time into a teaspoonful of water, or to administer the drug in capsules.

Owing to the insolubility and high specific gravity of bromoform, there is difficulty in removing it from the stomach by lavage. Walldorf's[2] suggestion is therefore worth adopting. By washing out the stomach with the patient in an inverted position, he was able to remove the drug easily.

REFERENCES.—[1]*Brist. Med.-Chir. Jour.* June, 1910; [2]*Med. Klin.* 1909, No. 47.

CARBENZYME TRYPSIN.

Hedin has shown that animal charcoal has the power of abstracting trypsin from a solution without apparently affecting the digestive power of the ferment, since in the presence of casein the absorbed trypsin is capable of causing digestion. Falk and Sticker[1] confirm Hedin's results. Charcoal has no antiferment action: it merely withdraws, probably by adsorption, the trypsin from the solution. In part the ferment remains attached to the charcoal, but in part the reaction is reversible, and in the presence of a casein solution the ferment becomes active and causes digestion. They found that vegetable charcoal also is able to remove trypsin from solution, but the vegetable charcoal gives up the adsorbed enzyme much more readily than does animal charcoal. They find also that charcoal can to some extent remove the antiferment present in normal serum. As vegetable charcoal gives up the adsorbed ferment or antiferment most readily to serum and other albuminous solutions, they decided to use vegetable charcoal as a medium for introducing trypsin into the body, or for using it locally. This preparation they called carbenzyme. Animal experiments showed that the injection caused no disturbance, and that in dogs suffering from sarcomatous growths the injections were followed by great improvement in the tumours. Subsequently the carbenzyme was administered to human beings. By the mouth it acted well in **Meteorism,** and in the troublesome accumulations of **Intestinal Flatus** which are so often seen after abdominal operations. It was also used in two cases of gastric and intestinal flatulence. It acted well as a **Dusting Powder to Wounds** which were healing badly. A thin emulsion in $\frac{1}{2}$ per cent. soda solution was injected into fistulæ and sinuses with success, but carbenzyme was of no value against warts and condylomata, and in acute suppurating wounds. They have also treated a small number of **Malignant Tumours** with the drug, and have often obtained striking diminution in the size of the tumour, without any febrile disturbance or marked constitutional reaction, as used to be seen with the injection of the trypsin alone. The action of carbenzyme seems to be much more marked upon sarcomatous than epitheliomatous tumours, but it is in neither case likely to produce complete cure.

Verth[2] has tested carbenzyme in various forms of **Tuberculosis.** He finds that the local use of carbenzyme has a favourable influence in all forms of surgical tubercle. After injection of carbenzyme the tissue responds as it does to iodoform-glycerin, but the curative action is often greater. The drug is injected as a thin suspension, and administration is not repeated till several weeks have elapsed, and only very small quantities of carbenzyme should be injected in tubercle of soft tissues. For injection, the drug is rubbed up with a $\frac{1}{2}$ per cent solution of soda. As the injection is painful, a preliminary injection of cocaine and adrenalin is advised.

A further development of this treatment is foreshadowed in some recent work of Sticker and Falk,[3] who avail themselves of the

phenomenon first observed by Rutherford, that charcoal can absorb radium emanation. They find that the absorption by charcoal of both trypsin and radium emanation does not interfere with the enzyme action, and in fact rather intensifies it.

REFERENCES.—[1]*Münch. med. Woch.* Jan. 4, 1910; [2]*Ibid*; [3]*Berl. klin. Woch.* June 6th, 1910.

CRATÆGUS OXYACANTHA (Hawthorn).

Reilly[1] has tested the therapeutic value of the ripe fruit of the hawthorn, which is highly recommended by the homœopathic and eclectic schools as a cardiac remedy. He used a fluid extract and tincture, and found these preparations pleasant to take, and safe. His most successful use of the drug is in cases of **Cardiac Neuroses,** in which it often acts surprisingly well. It is a mild cardiac tonic without any decided diuretic action, and does not raise blood-pressure. It cannot rival digitalis, but sometimes may be usefully tried in combination with that drug. Its chief value is where the heart is in a weak, irritable condition following influenza, or in neurasthenia, with a marked arrhythmia of the respiratory type. In these conditions it is often better borne than digitalis, as it causes less disturbance of the digestive tract.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Jan. 8, 1910.

DIASPIRIN.

This salt (succinyl-salicylic acid) is a modified salicyl preparation containing about 77 per cent of salicylic acid. The chemical constitution is expressed by the formula, $\begin{matrix} CH_2—COO—C_6H_4—COOH \\ | \\ CH_2—COO—C_6H_4—COOH \end{matrix}$ so that diaspirin may be considered tartaric acid ester of salicylic acid. Kaminer[1] states that diaspirin is a reliable **Diaphoretic** if given in two doses, first of 1 gram, and the second of 2 grams four hours later. As a rule, perspiration commences within half an hour after the second dose is administered. It is pleasanter to take than most diaphoretics, and in his experience of thirty-four cases there was only one failure. In two cases the dose required to be raised to 4 grams. The drug was chiefly tested in muscular rheumatism, influenza, and chills; and in a few cases of acute rheumatism, and thrice in gall-stone colic.

REFERENCE.—[1]*Berl. klin. Woch.* Nov. 22, 1909.

DIGITALIS.

Perrot and Goret suggest a new method of treating digitalis leaf to prevent any risk of alteration in the leaf during the drying process, from the action of diastases or oxydases contained in the leaf. For this purpose they advise destroying these ferments by exposing the fresh leaf to the action of vapour of alcohol at 75° to 80° C., and thereafter drying. From the leaf thus treated an alcoholic extract is obtained, entirely soluble in water, which, however, according to Bardet,[1] does not contain either digitalin, digitonin, or digitalein in the

free state. The activity of the preparation seems due to some water-soluble product of unknown origin which by hydrolysis forms the so-called active principles of digitalis, viz., digitalein, digitonin, and digitalin. The effect of 0·12 to 0·14 gram of the extract corresponds to 1 mgram digitalin by the mouth, but for hypodermic use not more than 10 cgrams in an isotonic solution should be given. With this dosage he has obtained excellent clinical results.

Etienne[2] maintains, in contradistinction to the view of Kochmann, that the slowing action of digitalis preparation on the mammalian heart is due to central stimulation of the vagus centre, and not to peripheral stimulation of the terminations of the vagus. The slowing ceases when both vagi are cut, and is not seen when digitalis is perfused through the excised mammalian heart, even when the vagus is still excitable. Any subsequent slowing is due to direct toxic action of the digitalis on the heart muscle.

Caro[3] cannot confirm Cloetta's statement that digitalis does not lead to hypertrophy of the normal rabbit heart. By careful experiments on young animals, Caro has obtained distinct muscular hypertrophy without any evidence of vascular changes, so that he ascribes the increase in thickness of the heart wall to the increased work thrown upon it under the action of digitalis.

Reference.—[1]*Bull. Gén. de Thér.* 1910, No. 4; [2]*Arch. de Pharm. et de Thér.* 1910, Vol. xx. fasc. iii. and iv.; [3]*Zeits. f. klin. Med.* 1910, Bd. 70, H. 5 and 6.

DIPHTHERIA ANTITOXIN.

Anderson[1] has investigated the important question of the keeping properties of antidiphtheritic serum. He kept samples under varying conditions for two years, and tested their efficacy at intervals of six months. He finds that dried antidiphtheritic serum in powder seems to retain its potency indefinitely at 5° C. In one case, after five and a half years, there was no loss of potency. On the other hand, fluid antitoxin steadily loses its power: the higher the temperature, the greater the loss. This holds true also for the serums concentrated by Gibson's method. The average yearly loss in potency of diphtheria antitoxin kept at room temperature was 20 per cent; for serum kept at 15° C., 10 per cent; and for serum kept at 5° C., 6 per cent. So far as the serum contains immunity units, it is still efficacious, but with age the content of immunity units gradually diminishes and the serum becomes less potent. He suggests that for tropical climates and for long voyages dried serum should be used. Fluid serum should be returned after two years, and to allow for deterioration should have at least an excess of one-third of the stated immunity content.

Reference.—[1]*Jour. Inf. Dis.* May 20, 1910.

DISINFECTANTS.

Bechhold[1] has investigated the semi-specific action of certain disinfectants for special organisms. He has found many instances, as the following table shows, where one kind of germ is specially sensitive to

one particular disinfectant. Thus this particular germ may have its growth inhibited by a solution of the disinfectant which is too weak to inhibit the growth of closely-allied species of germs. To this special susceptibility he gives the name semi-specificity. A knowledge of the special susceptibility of any given germ would obviously prove of great clinical value, by enabling us to select a disinfectant to which the germ is specially susceptible. He investigated a number of halogen derivatives of β-naphthol which are relatively non-toxic and capable of marked disinfectant action, even in weak solutions. The marked differences in the susceptibility of various germs to the different members of the series is seen in the accompanying table, which indicates the dilution in which the various drugs inhibit the growth of bouillon cultures of the germs.

	Staphylo-cocci	*Strepto-cocci*	*B. Diph-theriæ*	*B. Para-typhosus*	*B. Coli*
Lysol (reckoned for cresol content)	1–3,000	1–10,000	1–20,000	1–400	1–800
β-naphthol	1–6,000	1–8,000	1–10,000	1–4,000	1–8,000
Chlor-β-naphthol	1–20,000	1–20,000	1–10,000	1–4,000	1–12,000
Brom-β-naphthol	1–20,000	1–20,000	1–10,000	1–4,000	1–8,000
Dichlor-β-naphthol	1–40,000	1–30,000	1–2,000	1–4,000	1–16,000
Dibrom-β-naphthol	1–80,000	1–20,000	1–40,000	1–4,000	1–32,000
Tri-chlor-β-naphthol	1–50,000	1–20,000	1–22,000	1–400	1–20,000
Tri-brom-β-naphthol	1–250,000	1–60,000	1–400,000	1–1,000	1–1,300
Tetra-brom-β-naphthol	1–250,000	1–60,000	1–200,000	1–800	1–800
Penta-brom-β-naphthol	1–50,000	1–40,000	1–15,000	1–800	1–400

Standardization of Disinfectants.—Some valuable work was carried out by a special *Lancet* Commission[2] on the standardization of commonly-used disinfectants. These consist chiefly of phenolic bodies mixed with soaps, resins, or other emulsifying substances, so that with water an emulsion is formed. By a new chemical process it was found possible to assay these disinfectants as regards their phenolic content. By an adaptation of the well-known Rideal-Walker method, the bacteriological examination was carried out, using *B. coli communis* as the test organism. The bacteriological carbolic acid co-efficient thus obtained was found to correspond fairly accurately with the results of the chemical assay of the phenolic value. The chemical procedure in the assay consisted in treating the disinfectant with baryta water, which precipitates the soaps and resins, leaving the phenolic body in solution, from which it can be extracted by acidulation and washing with ether. The total phenolic bodies are obtained on evaporating this ethereal solution. The proportion of this which is carbolic acid can then be estimated by the bromine absorption in accordance with the equation, $C_6H_5OH + 6Br = C_6H_2Br_3OH + 3HBr$. It was found by actual analysis that the basis of most of the disinfectants is not true carbolic acid, but phenoloid bodies which have a lower power of absorbing bromine. It was possible to arrange the various disinfectants in an order which corresponded closely with their

germicidal value, as determined by actual bacteriological experiments by deducting from the percentage weight of phenoloid bodies found by the ether extraction, the actual percentage bromine value in terms of absolute carbolic acid. Thus for the *Bacillus coli* the formula $\frac{P-B}{3}$ gave the carbolic acid co-efficient in most cases (P is the actual percentage weight of phenol bodies found, and B the percentage of this which is carbolic acid, i.e., the carbolic acid equivalent by the bromine absorption method). The results, as set out in the following table,

Disinfectant	1 Phenols or Phenoloids (P)	2 Carbolic Acid Equivalent by Bromine (B)	3 Br. Equivalent deducted from actual weight of phenol (P-B)	4 $\frac{P-B}{3}$	5 Carbolic Co-efficient (*Bacillus Coli*), mean	6 Cost in pence of 100 units of efficiency
Cofectant	66·27	38·30	27·97	9·3	9·8	13·4
McDougall's M.O.H. Fluid	47·13	22·71	24·42	8·1	7·9	12·6
Kerol	40·56	17·23	23·33	7·7	7·7	22·2
Okol	48·50	27·44	21·06	7·0	8·9	13·5
Crude Carbolic	82·65	61·65	21·00	7·0	4·2	14·3
Bactox	39·70	19·30	20·40	6·8	9·5	11·5
Cyllin (bulk sample) ..	40·41	20·16	20·25	6·7	8·8	15·0
Cyllin (Medical).. ..	32·08	12·79	19·29	6·4	6·4	46·9
Calvert's No. 5 Carbolic ..	93·26	74·09	19·17	6·3	2·5	60·0
Izal	41·35	25·48	15·87	5·2	7·4	20·3
Lysol	50·96	40·45	10·51	3·5	1·7	88·2
Lawes'	28·20	18·08	10·12	3·3	1·6	62·5
Pearson's	20·70	12·73	7·97	2·6	2·2	68·2
Jeyes' (Chemists') ..	17·80	11·50	6·30	2·1	1·7	70·6
Krysyl	14·16	9·87	4.29	1·4	1·3	40·0
Zotal	10·00	6·70	3·30	1·1	1·5	24·7
Jeyes' No. 2 (Grocers') ..	5·13	1·87	3·26	1·0	0·75	160·0

show that under these conditions the bromine value of a phenolic body would appear to be an index of the germicidal power, the carbolic co-efficient figure coming to much the same figure whether fixed by the chemical or bacteriological method. The few exceptions which are found in the table are bodies which form clear solutions, not emulsions, when mixed with water. The germicidal values found under these ideal laboratory conditions are, of course not necessarily comparable to those obtainable in actual practical disinfection. Many factors are sufficient to alter the germicidal action, e.g., temperature, presence of albumin, or factors which affect the stability of the emulsion, such as salts or hard water. Much work remains to be done in determining what way and in how far these and many other factors modify the efficiency of a germicide. Certainly, in drawing up any comparative scale of germi-

cidal value, great care must be taken to make the conditions absolutely uniform. In this investigation, as high carbolic acid co-efficients as the manufacturers claim for their preparations were never obtained. In the results, as shown in the following table, the cost of 100 units of germicidal efficiency is obtained from the carbolic acid co-efficient and the price of the preparation per ounce. It refers to the conditions under which the experiments were carried out, and is only reckoned for the *Bacillus coli communis*.

REFERENCES.—[1]*Zeits. f. Hyg.* Oct. 28, 1909; [2]*Lancet*, Nov. 27, 1909.

DRUG ERUPTIONS.

According to Bruck,[1] medicinal rashes are due to anaphylaxis, and therefore the old term idiosyncrasy may be abandoned. He found in two cases of lupus, which reacted anomalously to tuberculin injections with measly and scarlatiniform rashes, that the patients' serum contained bodies which produced anaphylactic symptoms when injected into guinea-pigs. Animals treated with these serums became very ill within half an hour of an injection of tuberculin, and died in four or five hours. Control guinea-pigs treated with serum from other lupus patients presenting no abnormal susceptibility to tuberculin were able to receive subsequent injections of tuberculin without manifesting any symptoms. That this explanation also holds good for non-albuminous drugs is shown by the fact that exactly the same course of events happened with the serum of a patient who reacted to iodoform with cutaneous rashes. Healthy guinea-pigs were injected with this patient's serum. Next day iodoform was injected, and within five minutes the animals developed typical anaphylactic symptoms. Control guinea-pigs similarly treated with the serum of individuals not showing this peculiar susceptibility to iodoform were not affected by the subsequent injection of the same quantity of iodoform.

REFERENCE.—[1]*Berl. klin. Woch.* 1910, No. 12.

EUCALYPTOL-MENTHOL.

Berliner[1] has had very successful results from the injection of an oily solution of these drugs in various pulmonary conditions. He has had the opportunity of working up cases treated on this plan during four years by Prof. Ercklentz, and his report is very favourable. Originally Berliner suggested the treatment as suitable for **Phthisis**, but under Ercklentz the scope has been widened to include acute and chronic **Bronchitis** and **Gangrene of the Lung.** For these purposes he used a 25 per cent solution of eucalyptol in castor oil, and injected of this 5 cc. weekly into the gluteal region. In bronchitis the benefit is rapidly obtained, the sputum lessening in quantity, and the cough being relieved. It is the best treatment in gangrene of the lung. In phthisis during the first and second stage the injections are useful. For this purpose Berliner prefers the following mixture: menthol 10, eucalyptol 20, ol. dericini 100; or menthol 10, ol. dericini 30. Of

these, 2 cc. can be injected three or four times weekly, and later the strength of the solution can be doubled and the same quantity injected twice weekly.

REFERENCE.—[1]*Berl. klin. Woch.* 1910, No. 21.

EUGALLOL.

Ehrmann[1] has discovered that this derivative of pyrogallol (eugallol is the mono-acetate of pyrogallol) has a peculiar action on mucous membranes, which is wanting on the skin. Applied to a mucous membrane, a superficial caustic action is produced, shown by production of small eschars and a whitish coloration of the epidermis. This is accompanied by only very slight pain lasting for a few seconds, which is succeeded by a more prolonged period of complete local anæsthesia. These facts suggest that this drug may be used as an **Anæsthetic Caustic** remedy for the mucous membranes. Following the application there is a local proliferation of epithelium comparable to the known action of the drug on the skin. For application to the mucous membranes, a 5 per cent watery solution gives a fairly strong action, while a much weaker action is obtained by using a mixture of equal parts with castor oil.

REFERENCE.—[1]*Apoth. Ztg.* 1910, p. 382.

EUMENOL.

The tangkui root has been used in China from time immemorial as a remedy for **Menstrual Disorders,** more especially for amenorrhœa. It is asserted that the drug possesses a tonic, regulating action on the menstrual process. Hirt[1] investigated the pharmacological properties of the drug, and found it to be non-poisonous in action and incapable of producing abortion. Thereupon Merck introduced an extract of the drug under the trade name of eumenol, which has now been in use for a number of years. Eumenol has been favourably reported on by Mueller[2] and Buck.[3] Palm[4] has also put upon record his experiences with the drug, which he has intermittently used during the past nine years. His report deals with a small series of twelve cases in which the menstruation was delayed. His experience shows that the preparation was satisfactory in re-establishing the menstrual flow in seven out of eight cases of simple retardation of the menses. In one case of infantilism it seemed to have no action. In the remaining four cases the patients turned out to be pregnant, but the drug produced no disturbance of pregnancy, and had no abortifacient action. The amount of the drug required varies from a few teaspoonfuls, and as a rule about 50 cc. (about 2 oz.) was used.

REFERENCES.—[1]*Münch. med. Woch.* 1899, No. 23; [2]*Ibid.* 1899, No. 24; [3]*Belg. Méd.* 1899, Vol. ii. No. 48; [4]*Münch. med. Woch.* Jan. 4, 1910.

FIBROLYSIN.

Schnitter[1] states that he has observed in six out of eight cases a distinct augmentation of the amount of urine after injections of fibrolysin. The maximum effect is quickly reached, but the action is prolonged and the decline to normal is gradual.

Neisse[2] noted a febrile rise of temperature after injecting fibrolysin in a case of pleuritic adhesion. The patient was almost certainly tuberculous; and as his experiences recall the observations of Hebra made many years ago, that thiosinamine produced a febrile disturbance in quiescent phthisis, Neisse recommends that fibrolysin should not be given to a patient known or suspected to be phthisical.

References.—[1]*Münch. med. Woch.* 1910, No. 19; [2]*Ther. Monats.* May, 1910.

FILIX MAS.

Renzi has had three cases of successful administration of the ethereal extract of male fern in **Cysticercus.** Encouraged by these results, Dianoux[1] tested the drug on a patient suffering apparently from multiple cysticerci, who had epileptiform attacks and a progressive failure of vision of the left eye found to be due to a cysticercus in the vitreous. Subsequently a cysticercus appeared in the right groin. Under treatment with capsules of ethereal extract of male fern a tænia solium was expelled and the cysticerci were absorbed. That in the eye could be seen to first lose the active movements, and then become completely absorbed in the course of seven weeks, leaving only a vascularized cicatrix. During the administration of the drug, which was spread over a period of seventy-one days, the patient took in all 102 grams of the extract, the daily dose being about three or four capsules containing half a gram of the extract.

Reference.—[1]*Sem. Méd.* Dec. 15, 1909.

FORMAMINT.

Some experiments of Piasecki[1] do not bear out the favourable reports of previous observers on the value of this preparation as an oral antiseptic. Though formaldehyde is capable of bactericidal action on the normal bacterial flora of the mouth, the action is very weak when concentrations are used, comparable to those produced by sucking formamint tablets in the mouth. The direct action of formamint tablets dissolving in the mouth was also doubtful. If a large dose (2 tablets) is slowly sucked, a transient bactericidal action is produced, but the concentration of formaldehyde produced is deleterious to the mucous membrane, and there is a subsequent period of increased bacterial growth. With smaller doses (1 tablet every ten minutes) a more prolonged bactericidal action is obtained, but this seems too weak in effect to be of any real clinical advantage.

He found that a spray of *pyocyanase* gave the best bactericidal action. It acted best when sprayed in small frequently-repeated doses, but it remains to be seen whether such daily spraying would be capable of damaging the mucous membrane of the mouth.

Reference.—[1]*Lancet*, Nov. 6, 1909.

GELATIN.

Grau[1] has given us another verdict in the perennial controversy regarding the hæmostatic value of gelatin injections. His experience seems limited to a small series of ten cases, but in nine of these the

subcutaneous injection of from 20 to 40 cc. of Merck's sterile 10 per cent gelatin solution was followed by an increased coagulation of the blood. This effect begins to show itself in from two to four hours, and reaches its maximum about ten to twelve hours after the injection. It gradually disappears, and as a rule is gone in twenty-four hours.

Reference.—[1]*Deut. med. Woch.* July 7, 1910.

GYNOVAL.

This new valerian preparation (isoborneol ester of isovalerianic acid) was tested by Hirschfeld[1] in a series of twenty-five cases of **Cardiac Neurosis** suffering chiefly from such symptoms as palpitation, pain and discomfort in the region of the heart, and sensation of cardiac distress. In many of these cases it had a marked calmative action. In eight it was sufficient, with hydriatic treatment, to remove the disturbance entirely, while in twelve of the other patients, though it did not remove the disturbance entirely, it exerted a distinct calmative action after each dose. Hirschfeld states that though the drug occasionally produces unpleasant eructations, it does this to a less extent than most valerian preparations, and is readily taken by the patient.

Reference.—[1]*Berl. klin. Woch.* Oct. 4, 1909.

HECTINE.

This preparation is used to some extent in France. It is the benzol-sulphone-para-amino-phenyl arsenate of sodium, containing about 21 per cent of arsenic. It is readily soluble in water, and is quickly eliminated by the urine. After two to three days, over three-quarters of a dose is eliminated. As the toxicity is said to be low, there is little danger of dangerous accumulation. So far no instance of toxic amblyopia has been recorded. Hallopeau[1] prefers it to atoxyl and arsacetin as being less dangerous. He uses it in the dose of 20 cgrams, which he injects locally into the tissue surrounding the chancre in his method of aborting **Syphilis.** To reduce the pain of the injections, he adds to the solution 1 per cent of novocain. By a combined treatment of atoxyl ointment to the chancre, with local injections of hectine and active constitutional treatment with mercury and iodides, Hallopeau claims to have successfully aborted five out of six cases of syphilis.

Balzer and Dive[2] report four cases of secondary syphilitic iritis successfully treated with hectine.

References.—[1]*Bull. Gén. de Thér.* vol. cxix. No. 15; [2]*Bull. de Soc. franc. de Derm. et Syph.* Ap. 1910.

HEXAMETHYLENAMINE.

Urotropin was first used because it was eliminated in the urine partly as formaldehyde and partly unchanged. Since then it has been ascertained that the drug is eliminated by the bile and is present in the cerebrospinal fluid. Lastly, Barton[1] states that it is found in the secretion coming from the mucous membrane of the middle ear.

He demonstrated this in a case of **Purulent Otitis Media,** due to infection with *Diplococcus pneumoniæ*, which healed so rapidly under the oral administration of 1 gram of hexamethylenamine that he suggests that possibly a new field for the exhibition of this drug may be found in diseases of the middle ear. Brown[2] supports this statement.

Hanzlik[3] finds that hexamethylenamine is excreted unchanged in the saliva. He has only performed two experiments, but these show that the greatest excretion takes place during the first half-hour after administration. As the drug is excreted unchanged, he does not know whether it exerts any antiseptic action, but thinks it rather improbable that sufficient formaldehyde will be liberated to make the drug of value as an oral antiseptic.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Mar. 5, 1910 ; [2]*Ibid.* Ap. 16, 1910 ; [3]*Ibid.* June 11, 1910.

HYDROFLUOSILICIC ACID.

Though the disinfectant properties of chlorine, bromine, and iodine are constantly being utilized, fluorine, belonging to the same monovalent chemical group, is quite neglected, though its antiseptic powers are considerable. This is largely due to the fact that hydrofluoric acid is very toxic and as it acts on glass cannot readily be stored in glass vessels. Other compounds of fluorine are less toxic and do not act on glass. This is true for hydrofluosilicic acid, which, according to Chatzky,[1] is a good disinfectant. It is only slightly volatile, is colourless, does not destroy linen, cloth, or leather, and does not stain garments. Among other advantages is the fact that, whereas most of its salts are soluble in water, the potassium salt of the acid is insoluble. The author suggests that advantage may be taken of this fact in the sterilization of water ; this can readily be effected with the acid, which is then precipitated by adding some potassium chloride. He finds that an 8 per cent solution of hydrofluosilicic acid, which keeps indefinitely, kills cholera vibrios and *Bacillus typhosus*. Its bactericidal power is not inferior to that of phenol.

REFERENCE.—[1]*Vratch*, Sept. 26, 1909, in *Sem. Méd.* Jan. 26, 1910.

IODINE.

Winternitz[1] concludes from experimental and clinical observation : (1) That it is by no means proved that the action of iodine preparations depends entirely on ion-action, and that consequently iodipin and saiodin must first be converted into alkali iodides before they can act. (2) Even if it is granted that the iodine fats, before they can become therapeutically active, must be converted into iod-ions, there still remain distinct differences between them and the ordinary iodides : (*a*) As regards transport in the body, since organic compounds are carried to the site of action in an inactive form, and thus escape the deleterious effect of iodides on the digestive tract and vascular system ; (*b*) In respect of the distribution of the organic fatty iodine compounds in the tissues, whereby they cause a stronger local action and a more prolonged

splitting up. (3) Clinical observation shows that by using iodipin and saiodin the therapeutic effect is obtained with about one-third of the iodine content of the iodides, and that the risk of iodism is lessened, and if iodism does occur, it appears in a milder form.

REFERENCE.—[1]*Ther. Monats.* 1909, No. 8.

IONIC MEDICATION.

St. Leduc[1] administers salicylic acid by this method in obstinate cases of **Trifacial Neuralgia.** The negative electrode is soaked with sodium salicylate (1 per cent), and a current of 20 to 40 m.a. is passed for an hour.

Wollyamoz[2] also reports good results in three cases of acute **Rheumatic Arthritis** from the iontophoretic application of sodium salicylate to the joints. He employs very large kathodes soaked with warm water. Over these electrodes is sprinkled dry powdered sodium salicylate, and they are then applied to the joints and a current of 160 m.a is passed through for half an hour. A cure was obtained in from four to ten applications. [? If 160 m.a could be borne by patient.—Ed. *M.A.*]

REFERENCES.—[1]*Arch. d'Electr. Méd.* May 25, 1910, in *Centr. f. inn. Med.*; [2]*Ibid.*

IOTHION.

This drug, a di-iod glycerin, is an oily organic iodine compound, which contains about 80 per cent of iodine in the form of an organic compound. It has an odour of iodine. Its chief pharmacological interest lies in the fact that it is fairly well absorbed when applied to the skin. Thus it can be used for local treatment, and also to obviate any direct irritation of the gastro-intestinal tract. It is calculated that about 50 per cent of the iodine is absorbed by the skin; but of course the amount absorbed varies somewhat with different patients, so that the dosage is inexact. Richter[1] has used it with good results in **Chronic Bronchitis, Bronchial Asthma, Emphysema, Arteriosclerosis, Pleurisy,** etc. Nagelschmidt[2] uses it as a 10 per cent ointment, of which 3 to 6 grams are thoroughly rubbed into the skin for three to five minutes till the fluid is absorbed. If frequently applied to the same part the pores become stopped with fat, so that an occasional cleansing with benzene is useful. As an inunction cure for **Syphilis** he advocates the use of 3 to 4 grams of a 5 per cent ointment applied in turn over the arms, breast, legs, and abdomen. The cure lasts six weeks. Iothion is indicated wherever iodine is needed. It does not irritate the stomach or cause iodism, while properly applied it should not irritate the skin. For local syphilitic affections of the rectum, and for chronic or subacute prostatitis, iothion suppositories can be used.

REFERENCES.—[1]*Berl. klin. Woch.* 1909, No. 34; [2]*Ther. Monats.* 1909, No. 9.

IRON-SAIODIN.

Görges[1] recommends the combination of iron with saiodin as more palatable and better absorbed than the iodide and iron. It is put on the market in the form of chocolate tablets, each containing 0·5 gram

of iron-saiodin = 0·12 gram I and 0·03 Fe. The preparation is tasteless, easily absorbed, and is slowly broken up in the tissues. He recommends the combination in the hereditary syphilis of children, and in scrofulous manifestations — especially eczema, glandular enlargements, etc. In a series of cases where he tested it on scrofulous children, he noted as a special feature the rapid increase in weight and improvement in the general condition. As iron-saiodin is soluble in fatty substances, it is possible to combine it with cod-liver oil. The drug is by no means cheap, twenty tablets costing about two shillings.

REFERENCE.—[1]*Deut. med. Woch.* Sept. 8, 1910.

LACTIC-ACID BACILLI.

In opening the discussion on lactic-acid therapy at the British Medical Association Meeting, Grünbaum[1] pointed out that the beneficial action depended upon the formation of lactic acid, which is inimical to the growth of putrefactive germs. The advantage of living organisms over antiseptics and lactic acid is that the living germs produce the acid locally where it is of value. Theoretically, either lactic-acid-forming streptococci or bacilli may be used, but in actual practice the *B. bulgaricus* is to be preferred, as it is a better acid-producer, and contaminations are more easily recognized.

It is important to prepare a suitable nidus for the bacilli in the intestine by administering, for the first four days of treatment, a diet rich in carbohydrates and malt-extract, but poor in proteids and fats. The patient should be warned that this diet may produce flatulence. After four days a physiological diet may be substituted. As lactic-acid-forming bacilli are killed by their own metabolic products, it is advisable to administer milk just curdled, as this ensures that active, young, virile forms are given. In the first three days he gives $\frac{1}{3}$ pint of curdled milk thrice daily; thereafter this quantity is reduced to $\frac{1}{4}$ pint twice daily. He recognizes three classes of cases which benefit by the curdled milk: (1) Those in which the micro-organisms which cause irritation of the intestinal mucosa do not flourish in an acid medium, e.g., in many forms of mucous colitis; (2) Where putrefactive toxins are produced too readily or are excreted too slowly, as in certain cases of intestinal toxæmia and in disordered renal excretion; (3) Some cases of *maladie imaginaire*.

Hewlett discussed the bacteriology of soured milks. The bacilli isolated from the natural soured milks used in various parts of the world all belong to one species of *B. bulgaricus*, but at least two distinct races exist, viz., one which produces viscosity, and one which does not. The association of lactic-acid-forming streptococci with the *B. bulgaricus* in souring milk is not altogether a disadvantage, as the former produce an acid medium suitable for the growth of the bacilli, and the resulting clot is more uniform and less apt to contract. It should be noted, however, that the streptococci are more resistant than the bacilli, and in moist cultures, e.g., in cheese, displace the bacilli. Consequently, lactic-acid cheese should be used only in a fresh state. In dried tablets

the bacilli only survive about three weeks, but in milk cultures the bacilli maintain indefinitely their capacity for producing lactic acid. Incomparably the best method of administering the *B. bulgaricus* is as soured milk or soured whey. Various commercial tablets examined were not satisfactory, either as regards the numerical content of bacilli, or in their power of producing a good soured milk.

Bryce's paper dealt with the limitations of lactic-acid therapy. His position was that the chief value was as a milk diet. It acted more as a food than a curative agent. It is not well borne in cases of hyperchlorhydria. In most cases of dyspepsia, curdled milk aggravates the trouble, whereas fresh milk is often well borne. The curdled-milk diet tends to produce constipation and aggravates rheumatic manifestations. Even in intestinal conditions much of the benefit ascribed to using curdled milk may really be due to the ingestion of milk as such, and incidentally to the limitation of more harmful liquids. It is certain that there is no indication for the indiscriminate and widespread use of curdled milk as a therapeutic agency. With this somewhat sceptical attitude Sahli and Hutchison seemed to agree. Sahli thought that the claims made for soured milk as compared with ordinary milk tended to be exaggerated. It had certain advantages, and he had used it in gastric anacidity, and in enteritis and typhoid fever. It was also useful in diabetes mellitus, as in the process of souring the sugar of milk was reduced to about half. Harley's investigations on the influence of sour milk on metabolism were also not very favourable. The intestinal putrefaction seemed to be somewhat reduced when a small quantity of soured milk was added to a constant (Schmidt) diet. The aromatic sulphates and indican in the urine were slightly reduced. The absorption of food does not seem to be increased by the addition of a small quantity of soured milk to an ordinary diet.

Quant[2] has published some observations on the preparations of lactic-acid bacilli and the production of soured milk. He found four of the most popular brands of lactic-acid bacilli tablets rather unsatisfactory, but obtained good results with a milk culture. It produces a better and quicker curdling, and permits of the development of a higher yield of lactic acid than the tablets, as the risk of secondary fermentation is not so great. The addition of milk sugar, lactose, to the milk does not increase the percentage of lactic acid produced. The chief difficulties in the way of the successful production of soured milk are due (1) to employing insufficient bacterial substance, and (2) to inefficient temperature. The optimum temperature is between 100° and 110° F. Some popular forms of apparatus on the market are heated by means of a night-light, and the temperature produced with night-lights from the same box has been found to vary 15° F. To obtain the best results a moist culture is recommended, and cultivating for at least four hours between 105° and 110° F.; the growth of adventitious organisms is thereby inhibited, and an amount of lactic acid quickly produced to retard their subsequent development.

Brown's directions[3] are practical. He starts his growth with sauerin

tablets, but afterwards inoculates from the previous day's growth. To prevent contamination, all spoons, cups, jars, etc., are scalded or boiled, and allowed to dry by draining, no towel or cloth being used. To maintain the proper heat he uses a wooden box lined with thick carpet felt with an inner covering of holland. The fresh milk is brought to the boil, poured into a large (2-lb.) jam-pot, and allowed to cool to 95° F., when it is inoculated with the last day's brew, using two table-spoonfuls at least for each pint. The mixture is then put into the box, with an earthenware hot-water bottle alongside filled with water at 110° F.; this is allowed to stand for eight hours, after which the milk is removed to a cool place, which causes the curd to break up, and the milk is ready for use. The temperature of the water in the bottle should not exceed 180°, as when the growth goes on at high temperature the curd is green, the whey yellow, and the taste and smell intensely sour. When properly prepared the milk has a fresh, clean taste.

The following method of preparation of soured milk is advocated by Medalia,[4] of Boston: (1) Take one quart of ordinary milk daily. (If the fat is not desired, order one quart of *fat-free* milk from the milk-man); (2) Pour off one half-cupful from quart bottle (to make room for starter); (3) Replace lid or cork (not tight); (4) Put the quart bottle containing milk in a saucepan of *cold* water; (5) Bring water round bottle of milk to a boil, and keep it boiling for one-half to one hour (to sterilize the milk). *Do not boil milk*; (6) Remove bottle of milk from boiling water, and let it stand in cold place until it *cools*; (7) When milk is cold, shake up starter (in little bottle) and introduce it carefully into the milk; (8) Put on cork or lid tight, and shake it; (9) Place bottle in warm place (even temperature) on kitchen shelf (not any warmer than body temperature) for twenty-four hours; (10) At end of twenty-four hours the milk is fermented and should be of same consistency and smoothness as that of cream; (11) The next morning take the second quart of milk, and repeat process exactly as with the first quart of milk (pouring off one half-cupful, sterilizing the remainder, cooling it); (12) Pour in a little less than one half-cupful (about as much as was in little bottle) of the first quart of the already fermented milk in order to start the second, instead of starting the second quart with a "starter" as described. After the second quart is started from the first, the latter is ready for use and should be kept in ice-chest. Thus the second quart is started from the first, and the third with part of the second, etc. A new starter should be obtained upon the first sign of contamination, detected by change in taste or in the manner of curdling. Use this lactic-acid milk as food either *with* meals, replacing coffee or tea, or as dessert, or take it between meals with a cracker or toast. *Do not drink it like water.* To cleanse the bottle, pour in a weak solution of household ammonia and let it stand for ten minutes or so. This removes adhering particles readily.

Tablets in the dry form are expensive, and uncertain as regards bacterial content. Milk soured with tablets is unreliable in taste and bacterial content. A good clean soured milk can best be obtained by

implanting any lactic-acid organism in pure culture into sterilized, but not boiled, milk. The organism which gives the most palatable product should be chosen, as the therapeutic value of the milk does not depend upon any particular kind or variety of the bacilli, but chiefly on the presence of lactic-acid bacilli, and upon the fact that the soured milk is a good food.

Haydon[5] found an infusion of ground malted mealies, mealie meal, and sugar, preferable to milk as a culture medium. The liquid is pleasant to drink, and has a subacid, rather sharp taste. In it the organism thrives well and imparts a cloudiness to the liquid. No elaborate laboratory precautions are required in preparing the medium, provided that absolutely boiling water is used for the infusion, and that the bottles are thoroughly scalded before use. By inoculating a fresh quantity of the medium with some of the previous day's brew, the bacilli have been kept going for twelve months, and are apparently as vigorous as at the commencement.

In various Kaffir beer and milk preparations he found a Natalian variety of the lactic-acid bacillus closely resembling in its morphological and cultural features the Bulgarian bacillus, though it seems to produce rather more lactic acid in comparative tests.

Watson,[6] of the Glasgow Lock Hospital, has used lactic-acid bacilli in the treatment of gonorrhœal and mixed infections of the female genital tract. He filters a *sauerkultur* made from skimmed milk, the slightly opalescent whey containing lactic-acid bacilli in large numbers. After a thorough disinfection of the parts (including curetting when necessary) all excess of disinfectant is removed, and the lactic fluid introduced into the vagina. The first effect of the treatment may be an increase in the amount of discharge, which, however, is completely altered in character. The purulent appearance ceases, and the discharge is white and thin. This is removed daily by gentle swabbing with dry wool through a speculum. In the most favourable cases the secretions are normal in a few days. In other cases the treatment is repeated weekly until cure is complete, usually in two to three weeks. Even cases in which the tubes are involved seem to benefit by the treatment, and can be discharged from hospital earlier than used to obtain. Apart from lock-hospital work, many cases are met with at a gynæcological out-patient department, and also in general practice, where treatment is called for on account of a purulent vaginal discharge. The majority of such cases respond excellently to the above method of treatment. In two cases of urethral discharge in the male, remarkable results were obtained with similar treatment.

McLaughlin[7] suggests that in the local treatment of wounds and discharging surfaces by the direct application of living lactic-acid germs, it is inadvisable to use a culture medium already exhausted by the prolonged growth of the bacilli. Accordingly he prepared a powder consisting of the sterilized and dried solids of skim milk, with which is incorporated a dried culture of Metchnikoff's Bulgarian bacilli. During the preparation of the powder care is taken that the temperature does

not exceed 101° F. This powder has been used as an ordinary dusting powder in cases of carcinoma, chancroid, purulent ulcers, and ordinary septic wounds. The clinical results appear to show that the fullest action of lactic-acid bacilli is only obtained by applying them in a medium suitable to their growth and development in the wounds, and that this medium must be capable of undergoing lactic fermentation.

There is a certain apparent antagonism between *B. diphtheriæ* and *B. acid. lact.*, since Rosenthal[8] has found that in mixed growth the *B. acid. lact.* kills the *B. diphtheriæ* in the course of a few days. But this seems chiefly due to the formation of acid, since after the lactic-acid bacilli are killed, re-inoculated diphtheria germs grow quite well in the same medium after the acid produced by the lactic-acid germs is neutralized.

Berthelot[9] suggests the local use of lactic-acid preparations to get rid of infection of the nasopharynx with the meningococcus. He recommends as the best method of application the frequent use of a fine spray of a solution of a strongly acid-forming strain of bacillus grown on lacto-serum. In addition to meningococcic infection, it may also be used in cases of infection of the nasopharynx with streptococci in scarlet fever, diphtheria, adenoids, etc.

REFERENCES.—[1]*Brit. Med. Jour.* Nov. 19, 1910; [2]*Ibid.* Dec. 18, 1909; [3]*Edin. Med. Jour.* Jan. 1910; [4]*Bost. Med. and Surg. Jour.* June 2, 1910; [5]*S. Afr. Med. Rec.* Nov. 13, 1909; [6]*Brit. Med. Jour.* Jan. 22, 1910; [7]*Med. Rec.* Dec. 11, 1909; [8]*C.R. Soc. Biol.* Mar. 4, 1910; [9]*Rev. de Méd.* Aug. 1910.

LEECHES.

Weil[1] states that though the amount of blood which a leech sucks is only about half an ounce, owing to the continued oozing the quantity lost is much greater, and may reach from three to seven ounces. The leech, owing to the hirudin, causes a local condition of acute hæmophilia, the blood oozing drop by drop without any tendency to clot, and this oozing may go on for hours. The clot which eventually forms is soft, non-adherent, and does not contract. After the application of a leech the clotting-time of the blood is delayed. The viscidity of the blood is not affected. The red corpuscles are diminished, while the white cells are increased (by 4000 on an average), the leucocytosis being mononuclear in type. Clinically, leeches may be used to relieve **Congestion** and **Dyspnœa,** and to **Reduce Temperature.** They may take the place of phlebotomy, except in acute cases of uræmia, acute œdema of the lungs, etc., when the immediate withdrawal of a large quantity of blood is imperatively called for.

REFERENCE.—[1]*Med. Press,* Feb. 16, 1910.

LEUCOCYTE EXTRACT.

Zinsser[1] has continued his investigation into the leucocyte extract obtained by extracting with water a leucocyte exudate resulting from an injection of aleuronat. The extract possesses a certain bactericidal power, which is destroyed by heating to 75° C., and is not reactivated by addition of fresh leucocytes. This bactericidal power of the extract

is not increased in immunized animals, and in any case is so insignificant relatively to the total bactericidal power of normal blood that it cannot play even a secondary part in the curative action ascribed to the leucocyte extract in human infection. It seems, therefore, that the active substances contained in the leucocyte are just sufficient to enable the leucocyte to destroy the limited number of bacteria which can be ingested by the cell, and have no quantitative relationship to the specific immunity acquired by animals or human beings during their reactions against spontaneous or experimental infection.

Dwyer,[2] contrasting the value of vaccines and leucocyte extract in the treatment of eye, ear, nose, and throat infections, states that vaccines are contraindicated in acute constitutional diseases, such as pyæmia, septicæmia, and sapræmia, but in such cases the leucocyte extract finds its greatest field of usefulness, and will often save cases which are apparently hopeless. To give the best results the extract must be used early, before the patient is *in extremis* or moribund.

References.—[1]*Jour. Med. Research,* June 1910; [2]*Med. Rec.* July 30, 1910.

MEDINAL.

This preparation is the monosodium salt of veronal. Likudi[1] tested it in twenty-five patients, and found it satisfactory. A dose of 7½ gr. usually caused sleep within half an hour, which lasted as a rule for seven to eight hours. The sleep is not very deep, and on the following morning the brain is usually quite clear, though in about one-third of the cases there was complaint of heaviness, giddiness, or headache, which, however, passed off in a couple of hours. Apart from the hypnotic effect, the drug seems to exert a sedative action in **Hysteria.** In a few cases cough was lessened and asthmatic attacks were prevented. Steinitz[2] also found the preparation satisfactory as a hypnotic. It is easier to administer than veronal, as it dissolves more readily. The taste is better, and it acts more rapidly and more energetically. It can be given by the mouth, or by the rectum as a suppository. It seldom causes any unpleasant after-effects. He recommends the rectal administration wherever the stomach is irritable, and also whenever a rapid energetic effect is desired, as the drug so administered acts more promptly than when given by the mouth. The drug can be safely used in uncomplicated heart disease and in asthma and stenocardial attacks.

References.—[1]*Berl. klin. Woch.* Nov. 8, 1909; [2]*Münch. med. Woch.* 1909, No. 41.

MERCURIC CHLORIDE.

Pitzman[1] holds that, as usually applied, a wet perchloride dressing is never absorbed, and cannot act as an antiseptic in the tissues. Its action is purely that of a local germicide, preventing the entrance of germs. The reason is, of course, the presence of the albumin in the tissues. Though an extremely potent germicide in watery solutions, this action is powerfully affected by the presence of albumin, and may be entirely removed, unless the mercuric chloride is present in excess,

since the mixture of mercuric chloride and albumin is quite devoid of germicidal action. In human serum, the point at which mercuric chloride begins to exist as a free germicide is approximately 1–10,000. Consequently, if it is to exert a local antiseptic action in the tissues, it must be present free in this proportion; but before this can take place the affinities of most of the body albumin contained in the circulating fluids would require to be satisfied, which would certainly result in poisoning. Even if the free mercuric chloride ever did reach the proportion of 1–10,000, the tissue cells would probably suffer equally with the germs.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* July 23, 1910.

MERCURY ATOXYLATE.

A compound of atoxyl and mercury containing 24·2 per cent As and 32·3 per cent Hg was used by Miekley[1] in the treatment of **Syphilis.** An emulsion of 1 part of the drug to 9 of olive oil was used, and this was injected intramuscularly as follows:—For the first injection 0·5 gram is used = ¾ gr. of mercury atoxylate. This is repeated in three days. After another four days a dose of 1 gram is given, and then at weekly intervals three further injections of 1 gram each, so that in all, half a gram of the drug is used. The results are very rapid and striking, especially in papular lesions and in malignant syphilis, though the amount of As used altogether was only 0·12 gram and of Hg 0·16 gram. The drug produces slight local irritation, but not more than other preparations of mercury. As two female patients complained of eye trouble, the drug should be restricted for those syphilitic patients whose eyes are quite sound.

REFERENCE.—[1]*Deut. med. Woch.* 1909, No. 41.

MORRENIA BRACHYSTEPHANA.

This plant is obtained from the Argentine Republic, and has been investigated by Perrot and Chevalier.[1] They find that it contains about 0·8 gram per kilo of an inert alkaloid, but by means of hot alcohol they were able to obtain a dry extract of bitter taste and aromatic odour, which is almost entirely soluble in water. Physiological experiments show that this extract acts as a powerful **Galactagogue.** Chevalier and Goris[2] have tested its action on the composition of the milk of nursing women, and find that under its action the milk becomes more abundant and richer in fat, while the increase in casein is less marked, and the quantity of lactose is not affected.

REFERENCES.—[1]*Soc. de Thér.* Dec. 8, 1909; [2]*Ibid.*

NARCOTICS.

The influence of morphine injections on phagocytosis has been investigated by Reynolds,[1] who comes to the conclusion that morphine not only checks diapedesis, but phagocytosis is diminished to a marked degree. Thus, in one experiment, a dog received ½ gr. of morphia subcutaneously. The phagocytosis was tested against *Staphylococcus aureus* emulsified with 1 per cent sodium citrate solution. Before the

morphia, the number of cocci taken up by 25 leucocytes was 129; half an hour after, 64; one and a half hours after, 29. In another experiment a guinea-pig received ½ gr. of morphia subcutaneously. One hour later 2 cc. of broth were injected into the peritoneal cavity, and one hour later 1 cc. of a killed *Staphylococcus aureus* emulsion was injected into the peritoneum. The effect was tested against a control guinea-pig which had received no morphia, the fluid being obtained from the peritoneum half an hour after giving the emulsion. The morphinized animal did not give so much fluid, and it was less rich in leucocytes than the control. The number of cocci ingested by 60 leucocytes of the control was 112, as against 59 for the morphinized animal. The exudate was re-examined after twenty-four hours, when the cocci in the control's leucocytes were for the most part swollen up and stained badly, whereas the cocci in the white cells of the morphinized animal showed little change. The clinical conclusion that is drawn is that it is inexpedient to administer morphia in acute infections such as pneumonia or appendicitis, as the morphia, by temporarily paralyzing the phagocytic activity of the leucocytes, may enable the disease to obtain the upper hand. [This conclusion is hardly warranted from the brief description of the experiments recorded in this article, as the only tests recorded are against staphylococci. François[2] found that in therapeutic doses morphia had no effect upon the phagocytosis of yeast cells.]

REFERENCES.—[1]*Lancet*, Feb. 26, 1910; [2]*Thèse de Paris*, 1910.

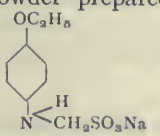
NASTIN.

Deyke reports favourable results from the use of nastin in **Leprosy.** In a leper asylum in British Guiana the preparation was used on a large scale on 111 patients. The treatment was prolonged. At first 1 cc. weekly of nastin B_1 was employed, which after five or six weeks was changed to the more powerful nastin B_2. As the patients became accustomed to the treatment, he suggested that after three months the treatment should be stopped for some months. The results were favourable. Out of 81 patients showing the tuberculous form of the disease, 72 were distinctly better, the deep swellings retrograding. The 30 nerve cases all improved, especially as regards the spots on the skin and the anæsthetic areas. The drug produced no ill-effects, and the general health of the patients was distinctly improved.

REFERENCE.—[1]*Monats. f. prak. Derm.* Bd. 49, No. ii.

NERALTEIN.

This substance is a powder prepared from paramidophenol, the structural formula being



It occurs as white glistening scales, which remain unaltered provided the drug is kept in a well-stoppered bottle and is protected from the

action of direct sunlight. Neraltein dissolves in ten parts of water at 60° F., but it is more soluble in boiling water.

The physiological action of the drug was investigated by Astolfoni.[1] In healthy men the blood-pressure is raised, the heart is slowed and the amplitude of the pulse increased. This effect lasts for about one hour, and is not followed by depression or any subjective disturbance. The dose of 1 to 3 grams is well borne, and as there is no cumulative action the drug may be given for several days in succession.

Gottlieb[2] tested the antipyretic effect of the drug in cases of **Facial Erysipelas,** and found that it acted well in this respect. Thus, out of 49 cases, in 31 the temperature was reduced to normal within the first forty-eight hours by doses of 0·5 gram thrice daily, and remained normal for the next three days, though the disease persisted. It seems to cure acute and subacute **Rheumatism,** and reduces the number of paroxysms in **Whooping-cough;** but it has no analgesic action in neuralgia.

REFERENCES.—[1]*Wien. klin. Woch.* 1909, No. 4; [2]*Centr. f. inn. Med.* Oct. 23, 1909.

OUABAIN.

Ouabain,[1] the active principle of *Acocanthera schimperi*, is a glucoside, soluble in cold water, and adapted for medicinal use either by subcutaneous, intramuscular, or intravenous use. Stadelmann has used the drug in forty-six cases of **Cardiac disease.** At intervals of five days he injects from 3 to 6 cc. of a solution containing 0·04 per cent ouabain. Though the results are uncertain, in some cases the benefit obtained is marked, especially in mitral regurgitation, the pulse becoming stronger, slower, and more regular. The effect on the kidney is also uncertain, but in some cases is striking. The drug is by no means free from risk, Stadelmann having seen toxic symptoms follow intravenous injections (nausea, vomiting, dyspnœa, restlessness, palpitation), and in three instances the result proved fatal.

REFERENCE.—[1]*Med. Klin.* 1909, Nos. 36, 37.

OVARADENTRIFERRIN.

Prochownick[1] recommends this combination of iron and ovarian extract in the treatment of artificial or natural **Menopause disturbance.** He has also obtained good results in chlorosis with imperfect genital development, and with similar hypoplasia of the sexual organs in exophthalmic goitre. The drug is given twice a day till 200 tablets are consumed, and, as a rule, is well borne. Each tablet contains 0·3 gram ovaraden = 0·6 gram fresh ovary of pig or ox, and 0·1 gram triferrin.

REFERENCE.—[1]*Centr. f. Gyn.* Nov. 13, 1909.

PANTOPON.

This preparation of Prof. Sahli is stated to contain in a soluble form all the alkaloids of opium. Heimann[1] has tested its value in **Gynæcological Cases.** In some respects he finds it better than morphia

and opium. It can be given hypodermically, and is thus used to allay pain after operations. As it does not interfere with peristalsis, it is superior for this purpose to morphia, which is liable to delay the passing of flatus, and so lead to a slight degree of meteorism. This he has never seen after the use of pantopon. In other cases he finds its power of allaying pain and inducing sleep as strong as that of opium, and it proved useful in commencing abortions.

Gräfenberg[2] has used the new preparation in gynæcological and midwifery practice. In **Midwifery** cases he found pantopon without any ill-effect upon the mother or infant. To deaden the pain he uses 1 cc. of the 2 per cent solution = 0·02 gram pantopon. In multiparæ a single injection is sufficient, but in primiparæ a second injection is often required about three hours after the first, to relieve severe pain. The drug should only be used in the early stages, and not during the expulsive period, as the absence of the acute sense of pain may prolong the expulsive stage by abolishing reflex contraction of the abdominal muscles. He confirms the statement of Heimann that there is little intestinal paresis, and that flatus is passed earlier than after morphia. Gräfenberg has found pantopon a satisfactory substitute for scopolamine and morphia as a preliminary treatment before administering chloroform or ether. He gives two injections each of 1 cc. of the 2 per cent solution ninety minutes and thirty minutes before the operation, and finds that the patients thereafter go more rapidly under the general anæsthetic. With the preliminary pantopon treatment he obtained abolition of the corneal reflex in five to six minutes, whereas with ether alone, without any preliminary treatment, it takes about sixteen minutes to reach this stage.

Rose Wertheimer-Raffalovich[3] investigated the action of pantopon on rabbits. In large doses it causes a distinct increase of the reflexes, which with toxic doses is revealed in convulsive attacks. Contrasted with morphia, pantopon, though distinctly hypnotic in action, does not produce such a marked narcosis in the rabbit. Though the respiration rate is somewhat diminished and occasionally rendered irregular by large doses of pantopon, the respiratory centres are not nearly so much depressed as after the administration of morphine.

Pertik,[4] from an extensive trial of pantopon in **Phthisical patients,** concludes that it is superior to opium and morphia. He found it a reliable remedy in relieving pain and alleviating paroxysms of cough, especially in the irritable condition associated with laryngeal tubercle. It appears to be more effectual than opium in checking diarrhœa, and Pertik found that, generally speaking, the patients preferred pantopon.

References.—[1]*Munch. med. Woch.* Feb. 15, 1910; [2]*Deut. med. Woch.* Aug. 25, 1910; [3]*Ibid.* Sept. 15, 1910; [4]*Ibid.* Sept. 8, 1910.

PERGENOL.

This combination of sodium perborate and sodium bitartrate, on dissolving in water, liberates peroxide of hydrogen and boric acid. From 100 grams pergenol, 12 grams H_2O_2 and 22 grams boric acid are

produced ; so that 10 grams pergenol with 120 cc. of water produce a 1 per cent solution of H_2O_2. Sachs[1] finds pergenol very useful in dentistry as a **Mouth Wash** and as an antiseptic irrigating solution. It may be used to brush the teeth with, and pastilles dissolving in the mouth are useful in septic conditions of the oral mucous membranes.

Reference.—[1]*Deut. med. Woch.* Jan. 20, 1910.

PHAGOCYTIN.

Czyzewicz[1] finds that subcutaneous injections of Rosenberg's phagocytin have a prophylactic value in preventing the development of **Puerperal Fever.** It has, however, no curative action when the infection has already occurred.

Reference.—[1]*Arch. f. Gyn.* 1909, Bd. 89, H. 3.

PHENOLPHTHALEIN.

A few articles on phenolphthalein have appeared in American medical journals, but contain little that is new. Gilbride[1] finds it a safe **Cathartic,** which usually acts in about six hours without pain, and is not followed by a tendency to sluggishness. In a few cases he has seen griping, due, perhaps, not to any irritating properties of the drug but to a personal idiosyncrasy of these patients. In some cases the drug loses its effect, and the dose requires to be raised. A dose of 3 to 5 gr. one, two, or three times a day will purge the average patient ; but if 5 gr. three times a day does not give the desired effect, he prefers to use another drug. Benedict[2] advocates a smaller dose, although a single dose of 10 cgrams (1½ gr.) will occasionally produce free purgation. The drug cannot be depended upon for an immediate single action. Few cases will bear a dose of 1½ gr. thrice daily without diarrhœa. The ordinary optimum dose is from ¾ to ½ gr. thrice daily. He calls attention to the fact that phenolphthalein is excreted in the urine as well as in the fæces, and, in the presence of free alkali, takes on a purple colour, which may alarm the patient.

Abel and Rowntree[3] investigated about a dozen members of the phenolphthalein group, and found the following characteristics common to all. They are non-irritating when applied to mucous membranes or open wounds, or when injected subcutaneously in oily solution. The toxicity is low, and they may be repeatedly injected into the veins of a dog without causing any discoverable pathological lesion. The most interesting observation was that the tetrachlor derivative of phenolphthalein causes a laxative action which is maintained for several days.

This drug was subsequently tested clinically by Rowntree.[4] Owing to its insolubility in water it is best administered in olive oil. If the neutral oil is slowly heated to 210°, the finely powdered drug, with stirring, dissolves to the extent of 0·2 gram in 10 cc., which solution can be administered subcutaneously. Practically all the drug is absorbed into the circulation in sixteen to twenty-four hours. It appears in the bile both in the free and in the conjugated condition, and is detectable

for some time. Thus, in a dog with a biliary fistula it lasted for two to three days, and in the fæces of healthy dogs it is seen for five to six days. As part of the drug is reabsorbed from the great intestine, and excreted again into the intestine, the purgative action is very prolonged. None of it seems to be excreted in the urine. Apart from the purgative action, the drug produced no local or systemic symptoms on animals. It was then tested clinically on human patients suffering from **Constipation.** The result in a series of thirty patients was as follows. A dose of 0·2 to 0·3 gram proved unreliable, but with 0·4 gram injected in 20 cc. of oil into the gluteal region excellent results were obtained. The laxative action does not appear as a rule till the day following the injection, but is then manifest for several days. It is mild in its effect, rather laxative than purgative, and does not produce colic or cramps. The drug undoubtedly is effectual when administered subcutaneously, but the low solubility in oil will limit its wide application. Still, as Rowntree points out, it may prove of considerable value in : (1) Coma ; (2) Marked gastrointestinal irritability which contraindicates the administration of a purgative by the mouth ; (3) Among the insane who refuse oral purgatives ; (4) In certain cases of chronic constipation, combined with hygienic, dietetic, and psychic treatment.

References.—[1]*Jour. Amer. Med. Assoc.* Jan. 29, 1910 ; [2]*Ther. Gaz.* Oct. 1909 ; [3]*Jour. Pharm. Exper. Ther.* Aug. 1909 ; [4]*Jour. Amer. Med. Assoc.* Jan. 29, 1910.

PHYSOSTIGMINE.

Winqvist[1] asserts that physostigmine salicylate in the dose of from 0·3 to 0·6 mgram has given him good results in **Neurasthenia.** This improvement he ascribes to improved metabolism from the action of the drug on the intestine and circulation, which enables dietetic and hydropathic treatment to be better carried on.

Reference.—[1]*Nord. Med. Arkiv.* 1910, Afd. 11, H. 1, p. 40.

PILOCARPINE.

According to Elschnig,[1] the continuous use of pilocarpine eye-drops in glaucoma is apt to produce a chronic condition of pilocarpine poisoning, characterized by tremor, palpitation, rapid pulse, great nervousness, and excitement. The symptoms cease on stopping the drug, but in some cases return almost immediately if the use of the drops is resumed.

Reference.—[1]*Med. Klin.* 1909, No. 51.

PINEAPPLE JUICE.

It has long been known that pineapple juice contains an active enzyme which is capable of digesting meat fibre. Williams[1] finds that it is very difficult to preserve the juice. He has tested glycerin, chloroform water, and alcohol in various dilutions, but finds that they all diminish the digestive power of the juice. Consequently he advocates only the use of the fresh expressed juice, which he finds a valuable and reliable vegetable **Ferment** for dissolving necrosed tissue in quinsy,

tonsillitis, boils, etc. It is not so good in corns, but recurrent urethral gonorrhœa where there is a copious discharge, may yield promptly to injections (diluted at first). Its value in gastric conditions is not so great, but it is useful as a preventive measure when the patient fears that he has taken too much dinner. The midnight lobster loses its terror, and dreamless may be the sleep even after mince-pies and fruit cake.

REFERENCE.—[1]*Med. Rec.* May. 28, 1910.

PITUITARY EXTRACT.

In the past year a few papers have appeared dealing with the therapeutic possibilities of the pituitary extract.[1] It will be remembered that this gland is described by anatomists as consisting of two lobes, an anterior glandular and a smaller posterior body consisting largely of nervous elements. Though the anterior lobe seems to secrete a colloid material, the active medicinal properties are said to be contained in the non-glandular posterior portion. The condition is thus closely analogous to that found in the suprarenal gland, and the physiological action of the pituitary and suprarenal glands is not very dissimilar. Thus, both preparations on injection raise blood-pressure, but whereas the suprarenal action is very transient, that of the pituitary extract is prolonged, while at the same time the heart is slowed and the pulse is fuller. On the kidney, the action of pituitary extract is **Diuretic.** It is said that there is local vasodilatation of the renal arteries following the vasoconstriction after the arteries of the rest of the body have come back to normal calibre. In addition, the drug has an action on other forms of involuntary muscle fibres, causing constriction of the intestines and uterus. It exerts an action on the general metabolism. Clinically, the extract is used to raise blood-pressure, to regulate the heart, to overcome insomnia, to cause diuresis, and overcome intestinal paresis. The average daily quantity required should not represent more than half a fresh ox-gland.

Blair Bell[2] recommends the extract of the pituitary gland in **Shock,** along with saline infusions. It is used to raise the blood-pressure during the critical time of vasomotor breakdown, while the saline infusion maintains the improvement obtained. The extract is also of use in producing efficient **Contraction of the Uterus** after delivery, and in checking **Post-partum Hæmorrhage.** Further, he finds it of great service in obviating or removing the distressing intestinal paresis and paralytic distention of the intestines which follow abdominal operations.

Wray[3] used intramuscular injections of Burroughs, Wellcome & Co.'s extract in three cases of **Post-operative Collapse.** The action was very rapidly obtained, but persisted for some hours. Leonard Williams[4] uses the pituitary extract to raise blood-pressure in **Typhoid Fever** and in **Tuberculosis.** In the latter condition it does not affect the course of the disease, but gives a considerable degree of subjective improvement. Though he has not obtained any real beneficial action

in exhausted cardiac action due to valvular disease, he finds the extract of great value in **Disturbed Action of the Heart** due to toxæmia. Thus he advises its use in the runaway heart seen after influenza. It is of great value in **Exophthalmic Goitre,** slowing the heart, allaying tremor, and checking flushing and sweating, but does not reduce exophthalmos or goitre. It is also of some use in **Paralysis Agitans,** checking the tremor. He recommends that the drug should be preferably administered by intramuscular injection. The usual dose quoted is from 2 to 5 grains, but larger doses may be given, as the only troublesome after-effects are polyuria and somnolence. The only contraindication is a sustained high blood-pressure, when it should not be used at all, and in all cases of prolonged use a careful watch on the blood-pressure must be maintained.

An interesting paper by Crowe, Cushing, and Homans,[5] summarizing their experimental work, enables us to appreciate the importance of the hypophysis cerebri for metabolism. Working with dogs, they found that the complete removal of the pituitary gland inevitably leads to the death of the animals, after the development of a characteristic train of symptoms (cachexia hypophysiopriva), of which the most notable features are altered disposition, with disturbance of gait, and a peculiar humped arching of the back (defæcation attitude). The breathing and circulation fail. There is a remarkable progressive fall of temperature, which towards the end is excessive. The animal finally passes through a stage of extreme lethargy into one of deep coma. In adult dogs there is diminution of urine, and glycosuria ; but in young dogs post-operative polyuria is frequently seen. In young puppies, after total removal of the gland, there seems little disturbance of health for ten or twelve days, when the typical symptoms set in, and prove fatal in two or three days. With adult dogs the cachexia develops much more rapidly within two or three days of the operation. The same symptoms after the same intervals of time follow the removal of the entire pars anterior alone, even though the posterior lobe remains in place. On the other hand, removal of the posterior lobe is followed by no symptoms, except perhaps excessive sexual activity. The most interesting observation was made that partial removal of the anterior lobe leads to definite constitutional disturbance. The most striking feature is a state of adiposity accompanied by (or resultant to ?) a secondary hypoplasia of the organs of generation in adults or sexual infantilism when the operation is performed before adolescence. Other symptoms are polyuria, glycosuria, alterations in the skin (œdema and hypertrichosis), while subnormal temperature and psychic disturbance are more or less common. By glandular implantation or injections of anterior-lobe emulsion, the life of animals can be prolonged even after complete hypophysectomy. In experimental hypopituitarism the injection of boiled anterior-lobe emulsion produces a characteristic febrile response.

Pituitary preparations are stated by Sardow[6] to be of use in certain forms of **Insomnia** characterized by low tension, general feebleness,

and chilliness, especially if the sleeplessness is intensified by a raised position of the head. He used the dried extract in doses of 0·20 to 0·40 gram, given an hour before bedtime, and sufficiently long after the last meal not to interfere with its digestion. The patient rapidly becomes accustomed to the remedy, and so the dose requires to be increased, and it is a good plan to use it for only short periods at a time.

REFERENCES.—[1]*Lancet*, Feb. 5, 1910; [2]*Brit. Med. Jour.* Dec. 4, 1909; [3]*Ibid.* Dec. 18, 1909; [4]*Clin. Jour.* May 18, 1910; [5]*Johns Hop. Hosp. Bull.* May, 1910; [6]*Bull. Gén. de Thér.* 1910, No. 16.

POTASSIUM IODIDE.

George Dock[1] has a very timely contribution, in which he advocates the use of potassium iodide until we are certain that we have something better in the iodine line to offer our patients. He uses a solution containing 1 gr. of the potassium to the drop, and he administers this solution in milk. He has not yet found a patient who could not take it, or who had any difficulty from the local effect on the stomach. He objects strongly to the statement of the retail man pushing new iodine compounds, that patients cannot be got to take iodides owing to unpalatability or gastric irritation. He gives it in rather large doses, about 15 gr. t.i.d., without any difficulty. Iodism, he thinks, is most likely to occur with small doses, and depends largely on lack of cleanliness in the skin and mucous membranes. Rarely we have to deal with a special iodide idiosyncrasy, and some of the cases of iodide coryza with headache, may well belong to this class. The more general symptoms, with nervousness, emaciation, tachycardia, etc., are really due to thyroid intoxication. With regard to the newer organic compounds which are alleged by the manufacturers to have many advantages over the inorganic iodides, he points out that the actual pharmacological proofs in favour of these contentions are conspicuous by their absence. He concludes that while all the new preparations may be worth investigating, those who wish to do so should begin with a careful and unprejudiced study of potassium iodide. In his experience potassium iodide can be taken easily, with safety, and in adequate quantities by most patients who need it. Other preparations may prove to be better, but need to be tested; and recommendations based on the inferiority of potassium iodide should be looked on with suspicion.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Nov. 13, 1909.

PROPÆSIN.

This propyl ester of paramidobenzoic acid is brought forward as a new **Local Anæsthetic.** It is said to be superior to cocaine in the absence of all toxic action, while unlike anæsthin it does not produce unpleasant local action, such as necrosis of tissue or eczema. According to Perl,[1] propæsin acts best when given as a dry powder. He has had excellent results in the pain of phthisis when the throat and larynx are implicated. The usual dose is 7½ gr., but as much as 60 gr. may be used in the day.

REFERENCE.—[1]*Med. Klin.* 1909, No. 50.

SABROMIN.

Boschi[1] has methodically tested the value of this new bromine compound (dibrombehenate of calcium) in asylum practice. He finds that it has very slight, if any, action as a hypnotic, and that its sedative action in states of mental excitement is also trifling; but he thinks that it is of value in **Epilepsy,** owing to the fact that it is pleasant to take, and does not produce bromism.

REFERENCE.—[1]*Gaz. deg. Osped.* 1909, No. 46, in *Centr. f. inn. Med.* Oct. 2, 1909.

SAIODIN.

Marcantoni[1] has tested this preparation in twenty-five patients. Apart from the usual claims that the drug is more agreeable to take than iodides, and that it is less likely to produce symptoms of iodism, he noted that in many cases an increase of weight occurred, and in all cases the arterial blood-pressure fell.

REFERENCE.—[1]*Gaz. deg. Osped.* 1909, No. 22, in *Centr. f. inn. Med.* Oct. 2, 1909.

SALICYLATES.

Essex Wynter,[1] in a lecture delivered at the Polyclinic, advocated the more extensive use of local applications of *methyl salicylate* in the treatment of **Rheumatic cases.** He instanced particularly rheumatic pericarditis and erythema nodosum as conditions favourably affected by the local treatment. His stock remedy was an ointment containing 2 dr. of oil of gaultheria to 1 oz. of lanolin; but liquid oily preparations are also useful.

Meyer,[2] a French military surgeon, makes some novel suggestions regarding *salicylate of sodium.* He claims that it exerts a sedative anæsthetic effect on the mucous membrane of the mouth, the pharynx, and the gums. The application of small pledgets of cotton-wool soaked in sod. salicylate to the cavity left on extracting a tooth, almost instantaneously allays the pain. Further, a 4 per cent solution applied to raw surfaces on the hands or face leaves a thin protective film on evaporation. He utilizes this in the treatment of **Hacks** and **Chapped Hands,** local **Defects of Epidermis, Sore Nipples, Ulcerated Chilblains,** etc., and replaces boric acid by salicylate of sodium in the treatment of many **Ocular troubles.** He is aware of the low antiseptic power of the drug, but thinks that this is more than counterbalanced by the fact that it does not interfere with the protective action of the tissue cells.

REFERENCES.—[1]*Hosp.* Aug. 6, 1910; [2]*Sem. Méd.* July 13, 1910.

SALINE PURGATIVES.

The purgative action of neutral saline salts is usually explained as dependent on osmotic principles. The salts are not readily absorbed from the bowel, and accumulate round them by a process of osmotic attraction, so much fluid that eventually peristalsis is induced. To this view only a few observers have taken objection. It is interesting, therefore, to note that Tyrode,[1] the most recent investigator,

concludes that the purgative action of the neutral saline salts depends, not upon their osmotic properties, but directly upon their specific power of stimulating peristalsis. He has devised a special nutritive saline solution, in which the rabbit intestine preserves its functional activity for a considerable time. He undertook three series of experiments with $NaSO_4$, $MgSO_4$, and Na_2HPO_4. He finds that the effect of these drugs differs when applied to the inside or outside of the bowel. When introduced in 5 per cent solution into the inside, they increase peristalsis without much affecting the fluidity of the contents. When they are applied to the outside of the bowel they diminish peristalsis. Further, against the osmotic view he points out that no greater purgation is produced by increasing the concentration of the fluid introduced into the bowel. His conclusion, therefore, is that the neutral salts owe their purging properties to some chemical constitution, and not merely to physical properties. The paramount action is that of setting up a local reflex contraction in the intestinal wall when introduced into the lumen of the gut. Though they may induce osmotic changes by their hygroscopic properties, the chief factor in producing purgation is the direct irritating action setting up a reflex contraction of the gut wall.

Strong support for this view is also furnished by several instructive experiments of Hertz, Cook, and Schlesinger.[2] In healthy men, after a dose of bismuth, the cæcal sounds and *x*-ray shadow appear in about four hours. The simultaneous administration of a saline purge moves the bowels within an hour, but does not hasten the appearance in the cæcum of the sounds or shadow. That the saline does not pass rapidly along the small intestine is proved by examining the discharges from patients with low iliac fistulæ, which showed that the bismuth and purgative salt appeared at the same time, and reached their maximum value together. Analysis of the fluid motion passed soon after administration of a saline purge shows that far too little of the salt is present to sustain the osmotic theory. In fact, the main bulk of the salt passes usually in the first firm stool, when it may be as much as four times the normal quantity, whereas in the fluid stool only a few grains in excess of the normal may be found. They are therefore forced to abandon the physical theory, and agree with M'Callum that the saline purgatives only act after absorption. *X*-ray examination shows that the purgative action is on the whole of the large intestine. The reason why the saline purges act more rapidly when given largely diluted with water, is that they pass more rapidly through the stomach and are absorbed quicker.

References.—[1]*Arch. Internat. de Pharm. et de Thér.* 1910, vol. xx. fasc. iii. and iv.; [2]*Guy's Hosp. Rep.* vol. lxiii.

SARTON (Soya Bean).

Soya beans[1] contain little starch and fermentable carbohydrate (about 6 per cent), but are rich in proteid material (about 30 to 35 per cent). V. Noorden and Lampé have found a preparation called

sarton useful in **Diabetes.** In sarton all the carbohydrate material of the bean is removed, and diabetic patients take it readily as a thick soup, or as an addition to meat and fish. It does not seem to cause any increased excretion of sugar.

REFERENCE.—[1]*Ther. d. Gegenw.* Ap. 1910.

SEA-WATER PLASMA.

Boutillier[1] has had excellent results from the use of diluted sterile sea water in the treatment of **Malnutrition,** but White[2] states that this treatment is uncertain, and may give rise to disappointment. In all **Skin conditions,** however, a certain amelioration is produced, especially in tuberculous ulcers. Leary[3] states that the results from the subcutaneous injection of isotonic sea water did not indicate that it possessed a sufficiently greater value than physiological salt solution to justify the expense and the time consumed in obtaining and preparing it. Neither agent was satisfactory in advanced cases.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Jan. 1, 1910; [2]*Bost. Med. and Surg. Jour.* July 29, 1910; [3]*Ibid.* Aug. 18, 1910.

SERA. (*See also* VACCINES.)

Antigonococcic Serum.—Schmidt[1] tested the relative value of vaccine and serum treatment in a large series of gonorrhœa and its complications. In cases where there was either acute or chronic involvement of the urethral adnexa, the serum had practically no influence, but vaccine treatment was beneficial in these cases. As regards arthritic complications, he reserves the serum treatment for the chronic arthritic cases and the acute and subacute multiple joint involvements, i.e., cases of gonorrhœal rheumatism where the joint trouble is due to the gonococcus toxin and not to metastatic invasion of the joint by the gonococcus; the latter do better with vaccine treatment. As regards the dose of the serum, he recommends from 4 to 6 cc. injected into the muscular tissue of the buttock at intervals of five days.

Thomas,[2] discussing the relative value of antigonococcus serum and vaccine therapy, states that while he has never seen any benefit from the use of serum in acute gonorrhœal infection, he considers it indisputable that chronic gonorrhœal arthritis is favourably influenced by the administration of serum. In the subacute complications the results are questionable; but there has never occurred any noteworthy or definite improvement in the chronic stages and sequels of gonorrhœa involving the genito-urinary tract. He has observed almost incredibly good results in gonorrhœal arthritis by vaccine therapy.

Antimeningococcic Serum.—Very favourable reports are given by Dopter[3] of the value of the polyvalent serum obtained from immunizing horses by progressively increasing doses of living cocci of different strains. The injections are given at first subcutaneously, and later are injected directly into the veins. With weekly injections an efficient antimeningococcic serum is obtained after about four months' treatment. The clinical results of the use of the serum are very good. Thus the mortality among 406 cases of cerebrospinal fever treated

with the serum was only 16·44 per cent, against a mortality of 65 per cent among those cases treated without serum injections. The other results of the serum treatment are rapid amelioration of the individual symptoms and shortening of the disease.

To obtain favourable results it is necessary to use large doses injected directly into the spinal canal, and to repeat the dose frequently at intervals of a few days. The advantages of frequent adequate injection is brought out by the analysis of the 359 cases in which the details of the serum treatment are known. In 282 this was used properly in large doses frequently repeated, with a mortality of only 8·15 per cent; whereas in the remaining 77 cases the treatment was not properly carried out, either a single injection being used, or too small doses repeated at frequent intervals. The mortality among this group of 77 cases was 27·2 per cent. The author recommends injecting in the adult 20, 30, 40, or even 45 cc. of serum directly into the spinal canal, after having previously removed as far as possible a corresponding quantity of cerebrospinal fluid. In children, even when less than a year old, it is possible to inject 10, 15, 20, or even 30 cc.

Weaver[4] reports a case successfully treated with repeated injections of Flexner and Jobling's serum into the spinal canal. Fischer[5] records the case of an infant, two months old, where the injection of Flexner's serum was made directly into the lateral ventricles. The infant recovered.

Flexner's meningococcic serum has been found useful in the treatment of *gonorrhœa*. Pissavy and Chauvet[6] had good results with subcutaneous and intramuscular injections in gonorrhœal arthritis, and Le Masson[6] found the serum a very rapid remedy in a case of pelvic gonorrhœal infection. Five days after the first injection the vaginal secretion had dried up, and the local signs of pelvic inflammation had vanished in fourteen days.

Antistreptococcic Serum. — Nathan Raw,[7] during the past twelve years, has treated 210 patients suffering from acute streptococcic infections with injections of antistreptococcic serum. The first 28 cases received a dried serum manufactured from a single strain of streptococcus, and the results were beneficial in a fair proportion of the cases. A polyvalent serum, which he considers a distinct advance on the single-strain serum, was used in the remaining 182 patients, and he unhesitatingly states that the results were most gratifying. The more local lesions appear to do better than the general systemic infections, such as puerperal septicæmia, but even in this formidable disease he obtained excellent results. He administered it by the rectum in doses of 20 to 30 cc. diluted with 40 cc. of normal saline, and he finds that the serum is rapidly absorbed and seems to act quickly and efficaciously, without producing toxic effects such as urticaria, erythema, and headache. In puerperal septicæmia the serum given twice daily seems to have a good effect. Sometimes it is only necessary to give one or two injections before general improvement commences. It is in acute erysipelas that the best results from serum are obtained.

Raw looks upon all cases as favourable provided there is no formation of pus or extensive subcutaneous cellulitis. In these cases extensive incision and drainage must be combined with large doses of serum two or three times daily.

It is interesting to note that the investigation by Hectoen-Weaver and Tunnicliff[8] of the various anti-streptococcus serums upon the market was not favourable. In a preliminary report they state that streptococcus opsonins could not be demonstrated in any of the antistreptococcus serum, and activation by fresh serums was not accomplished to any significant extent. No increase in any notable degree in the streptococcus opsonin was obtained in the blood of rabbits injected with the antistreptococcus serums. The attempt to obtain protective or curative effects from the injection of the anti-streptococcus serums in rabbits, guinea-pigs, and mice was unsuccessful. The serums often seemed to reduce the natural resistance and to hasten death.

REFERENCES.—[1]*Ther. Gaz.* Sept. 15, 1910; [2]*Jour. Amer. Med. Assoc.* Jan. 22, 1910; [3]*Ann. de l'Inst. Past.* 1910, vol. xxiv. p. 96; [4]*Lancet*, 1910; [5]*N.Y. Med. Jour.* Mar. 26, 1910; [6]*Ann. de Gyn. et d'Obst.* 1909; [7]*Brit. Med. Jour.* June 25, 1910; [8]*Jour. Amer. Med. Assoc.* Jan. 22, 1910.

STROPHANTHIN.

Several writers recommend the use of the glucoside strophanthin in the treatment of **Cardiac disease.** It is not well borne by the stomach, and is given either by injection into a vein or into the muscular tissue. Neither method is perfect. If any of the solution escapes from the vein it produces great pain, and the intramuscular injection is often painful unless the part is well massaged. It is claimed for both methods of administration that a very rapid therapeutic action is obtained, lasting several hours. The drug should only be used in desperate conditions, as already some ten cases are on record where the injection has resulted in the rapid death of the patient. For intramuscular injection Crispolti[1] recommends the dose of 1 mgram, which may be repeated once or twice if required. For intravenous use the dose is smaller, $\frac{1}{4}$ to 1 mgram. He has used strophanthin in thirty cases of severe cardiac failure. Pennesi's[2] experience is more limited, and comprises only ten cases. He points out that unless benefit is obtained with the first or second dose, persevering with the treatment is useless. Stone[3] recommends the use of strophanthin in the failing heart of pneumonia. Henderson[4] also speaks highly of the drug in cardiac conditions.

Most of these writers have used an amorphous form of strophanthin, but Bailey[5] employs a crystalline form, which is more potent. One mgram of the amorphous form corresponds to 0·4 mgram of the crystalline strophanthin, the latter being more than twice as active. With daily doses of 0·3 to 0·5 mgram crystalline strophanthus given by deep intramuscular injection, no very striking result was obtained in twenty cases showing loss of compensation; but more definite results were obtained in a further series of twenty-seven cases with larger doses.

He advocates ½ mgram as a daily dose, though he has himself used three doses of this size in the twenty-four hours. The dose should not be repeated without careful study of the condition of the circulation. Properly used, crystalline strophanthin is a valuable cardiac stimulant when compensation has broken down in myocarditis or in chronic valvular disease. Its use should be restricted to emergencies, and it is not suitable for continuous administration. Under the action of the drug the size of the heart to percussion is diminished in dilated conditions, and many murmurs due to dilated orifices completely disappear. The rate and rhythm of the heart are markedly affected. In two cases signs of bigeminal rhythm with early extra-systole appeared. The effect upon the blood-pressure is not marked. In most cases the rise is only a few millimetres, but is greater when the original systolic pressure is as low as 95 to 110.

REFERENCES.—[1]*Il Policl.* 1909, p. 248; [2]*Ibid.*; [3]*Bost. Med. and Surg. Jour.* Aug. 19, 1909; [4]*Amer. Jour. Med. Sci.* Sept. 1909; [5]*Jour. Pharm. and Exp. Ther.* Oct. 1909.

THIOSINAMINE. (*See also* FIBROLYSIN.)

Martin[1] has tried injections of thiosinamine in a case of **Chronic Gout,** and obtained a cure by the use of thirty injections given every second day, whereupon one injection every four weeks prevented a relapse.

Heeger[2] obtained great improvement in regard to pain and stiffness in thirteen cases of **Chronic Arthritis** and two cases of **Arthritis Deformans** treated with thiosinamine.

Starkenstein[3] claims to have obtained a definite result from the maceration at blood heat of powdered skin in a solution of thiosinamine. He states that the collagen is converted into gelatinous material, and that this explains the action of thiosinamine on cicatricial tissue. The effect is greater in the presence of serum. The gelatinizing action is due to the presence of the allyl group in the thiosinamine molecule, as it is only obtained with similar substances containing this allyl group.

Hayn[4] reports the case of a strong man, healthy except for tuberculous warts, who developed toxic symptoms during a course of thiosinamine injections. At intervals of two or three days he received injections of 0·2 gram thiosinamine or one ampulla of fibrolysin. For the first few injections he complained of slight after-headache, but three subsequent injections of thiosinamine were followed by rapid rise of temperature, rigors, and severe headache lasting for two days, and accompanied by great thirst and profound prostration. Vomiting was very marked at the first toxic reaction, but after the two subsequent administrations it was absent. The patient reacted, not only to thiosinamine, but also to fibrolysin in the same fashion. Hayn points out that evidently there is a well-marked characteristic idiosyncrasy shown by some patients for thiosinamine, and suggests that the drug should be used with caution wherever the patient experiences headache after the first injection.

REFERENCES.—[1]*Med. Klin.* 1909, No. 40; [2]*Münch. med. Woch.* Feb. 1, 1910; [3]*Ther. Monats.* Feb. 1910; [4]*Münch. Med. Woch.* Feb. 15, 1910.

THYMUS GLAND.

Gwyer[1] states that in many cases of severe **Cancer** which had failed to obtain benefit with other orthodox methods of treatment, prompt and continuous improvement was obtained on administration of thymus preparations. He is convinced that thymus treatment will eventually be found a valuable remedy for cancer, and for that class of diseases due to improper metabolism. Among the illustrative cases which he gives are **Exophthalmic Goitre, Hæmorrhoids,** and **Tubercle,** all of which seem to have benefited by the treatment. The dried powdered thymus can be used in doses varying from 30 to 120 gr. three or four times a day.

REFERENCE.—[1]*N. Y. Med. Jour.* Feb. 19, 1910.

THYROID.

Fjeldstad found that the presence of the thyroid gland was not essential in the production of immune bodies, since the removal of the thyroids does not appreciably affect the formation of the immune bodies, at least during the first month. Perrin and Jeandelize,[1] however, found that after removal of the thyroid gland, rabbits become more susceptible to calomel, and succumb much more rapidly ; while Marbe[2] states that the production of hyperthyroidism by the previous administration of thyroid gland renders guinea-pigs more susceptible to typhoid bacilli. Carlson and Woelfelt, in an attempt to discover the route taken by the internal secretion of the thyroid gland, found it unlikely to be by the lymph coming from the thyroid, as this contained no excess of iodine, and had no action on the circulation when injected. Possibly, therefore, the internal secretion finds its way directly into the blood.

Bircher's[3] experiment with thyroidin feeding in young rats led to rather remarkable results. Contrasted with controls of the same litter, the animals fed with thyroidin were much smaller and emaciated, and their coats were in bad condition. The bones showed marked changes at the growing epiphyseal lines, which were either closed, or reduced to a very fine line. He concludes that the thyroidin administration has an action on the growing bone of young animals, causing, not increased growth in length, but more rapid deposit of lime salts at the epiphyses. This calcification goes on so rapidly that the supply of cartilage is used up before the growth in length is provided for.

REFERENCES.—[1]*Soc. Biol.* Dec. 19, 1909 ; [2]*C. R. Soc. de Biol.* No. 8, 1910; [3]*Arch. f. klin. Chir.* Bd. 91, H. 3.

TRIONAL.

The relative safety of single large doses of trional is well shown by two cases of poisoning with massive doses reported by Mackintosh.[1] In the one case a woman, aged thirty-seven years, swallowed 185 grams of trional, 20 grams of veronal, and also the bottles which had contained the drugs, after crushing them into powder. Seen next morning she was unconscious, but moved her eyelids when asked in a loud voice to open her eyes. In the afternoon she became more uncon-

scious, and high-coloured urine, containing a trace of hæmatoporphyrin, was passed involuntarily. She slept profoundly throughout the second day, but regained full consciousness on the third day. The other patient, a woman forty years of age, took 125 grains of trional in tablet form. Seen twenty hours afterwards she was lying semi-comatose, but would open her eyes when addressed. By the end of forty-eight hours she had recovered completely.

Reference.—[1]*Lancet*, Jan. 8, 1910.

TRYPSIN.

Brüning[1] is not much impressed with the results obtained by the local application of trypsin solution in the treatment of **Tuberculous disease.** As the result of an extended trial in over a hundred cases, he states that it gives good results in small cold abscesses and in tuberculous disease of the tendon sheaths. It was not superior to glycerin-iodoform injections in burrowing abscesses. Joint cases with bone involvement do not do well, and enlarged or caseating glands are also unsuitable for the trypsin treatment, but in a few cases where the glands had completely broken down, aspiration, followed by injection of the trypsin solution, caused rapid cure. He notes that in none of his cases was a deleterious effect seen after the injections. There was nothing resembling anaphylaxis or medicinal rash, but in some patients a painless œdema developed over the injured part, and sometimes spread a considerable distance. As a rule, it disappeared in a short time, but in a few cases persisted for several weeks. At first the local application of the trypsin solution causes the secretion of thin yellowish pus to become reddish in colour from the admixture of blood, and of the consistence of an emulsion. Later the discharge become serous and poor in cellular constituents. After the discharge dries up, there remains for a considerable period a dense, painless infiltration, which yields no pus on puncturing, and is gradually absorbed.

Reference.—[1]*Deut. med. Woch.* Sept. 1, 1910.

UROTROPIN. (*See* Hexamethylenamine.)

VACCINES. (*See also* Sera.)

L. C. Bruce[1] found that the use of a polyvalent vaccine of several strains of streptococci exerted a beneficial effect upon the nutrition of patients suffering from mania. He had previously noted that in many cases of mania the blood contained agglutinins to certain streptococci, which agglutinins were not often present in the blood of healthy people. A series of eleven cases of mania were treated with the vaccine. Eight of the patients had been ill over a year, in two the mania had lasted for over two months, and the remaining case was a recent admission. Two of the chronic and two of the recent cases recovered under the vaccine treatment; but the most striking effect was that eight out of the series of eleven cases markedly increased in weight. He is satisfied that in certain cases of obstinate

malnutrition, vaccine injections improve the general nutrition. To obtain the best results, the dose of vaccine should be so small that it does not produce a constitutional reaction. He gave from 7 to 10 millions of his polyvalent vaccine at intervals of a fortnight.

Semple[2] investigated the question whether a better immunizing response is obtained to intramuscular or subcutaneous inoculations of typhoid vaccine, but found no practical difference in rabbits as regards the production of agglutinins and opsonins. As the subcutaneous method of using a vaccine causes less pain and inconvenience, there is no practical advantage in administering the vaccines intramuscularly. On the other hand, Mendel[3] advocates the direct injection of tuberculin into the vein in preference to subcutaneous injection. The dosage is more accurate, as all the tuberculin reaches the blood-stream, whereas with subcutaneous administration a certain portion remains in the subcutaneous tissue, and may cause trouble with subsequent injections. Owing to the absence of local irritation, the intravenous injection is less painful than the subcutaneous. He quotes some work done by Koch in 1901 as proof that the curative effect (shown by the development of agglutinins) of a dose administered directly into a vein is ten times greater than that obtained with the same dose injected into the subcutaneous tissue. Mendel states that the general reaction after intravenous and subcutaneous injection runs a similar course, but the temperature rise is rather greater after the intravenous injection.

Colon Bacillus.—Wulff[4] is impressed with the value of vaccine treatment in infections of the urinary tract with *Bacillus coli*. Out of twenty-three cases treated he has had eighteen successes, either absolute cures, or great improvement with clearing up of urine, fall of temperature to normal, and improvement in the general condition. Billings[5] has also had excellent results from autogenous vaccines in infections of the urinary tract with *Bacillus coli*. While improvement may occur in all cases, a complete cure of the bacilluria will not usually be obtained if there is stagnation anywhere in the urinary tract; hence he advises surgical or mechanical measures to correct anatomical faults which interfere with proper drainage of the urinary tract. He thinks colon bacilluria is not uncommon, but does not always produce a systemic disease; hence, in any case where such bacilluria is detected, he advises that one should attempt by agglutinative, phagocytic, bacteriolytic, etc., tests, to make sure that the colon bacillus is the cause of the systemic symptoms before submitting the patient to vaccine treatment.

Erysipelas.—Weaver[6] holds that killing the germs by means of heat affects the antigen-forming properties of streptococcic vaccines, and that a better immunizing response is got to a vaccine of streptococci killed by exposing to a strong (25 per cent) galactose solution without the aid of heat. He used such galactose-killed vaccines in scarlatina and erysipelas without obtaining very beneficial results. The injections given early in the course of scarlet fever do not prevent

later streptococcic complications. The course of the disease in acute erysipelas and in the acute stages of streptococcic complications of contagious disease was not affected by the injections. In subacute and chronic erysipelas and in streptococcic complications of contagious diseases which have become chronic, injections of galactose-killed streptococci are sometimes followed by favourable results, and at other times no appreciable effect is seen. His experience with the spontaneous improvements which so often were seen during the period in which the vaccine was being prepared, impressed him with the necessity of using great caution in ascribing the improvement to the injections in these apparently favourable cases.

Gonorrhœa.—Schindler[7] does not believe that phagocytosis plays much part in the cure of gonorrhœa of mucous membranes. The cocci are simply removed by the phagocytes, not destroyed, and hence not enough autotoxin is liberated to cause a response by the tissues. To this fact he ascribes the well-known clinical observation that vaccine therapy does not cure acute gonorrhœa. He thinks that the real action of gonococcus vaccine is to call forth a specific response in gonococcic tissue by the production of antigen and antibodies. It therefore acts only in shut-off, encapsuled tissues. Hence the clinical value of vaccine in epididymitis, arthritis, and localized lesions of the internal genital organs in the female. In such cases, with an encapsuled internal lesion, the administration of vaccine may, by causing a satisfactory immunity, result also in the cure of the mucous-membrane infection. Thomas[8] has obtained almost incredibly good results in *gonorrhœal arthritis* by vaccine therapy, but is doubtful if any good results will be obtained by general practitioners who do not possess the requisite bacteriological knowledge. Though good results may also be obtained with a stock vaccine, it is most important to determine the specific organism causing the infection, to isolate it, and make a culture. He is of opinion that it is important to prepare a fresh vaccine every two to four weeks to obtain the best results, as possibly a vaccine may alter in potency if kept too long.

Many reports have appeared regarding the use of vaccine therapy in gonorrhœa. It seems to be generally accepted that vaccine therapy does not cure the urethral discharge. Hartwell,[9] Jamieson,[10] Cushing,[11] all agree on this point. The chief benefit of the vaccine therapy seems to be obtained in arthritis and other complications of the disease. In arthritis many writers seem to have had successful results. Small series of successful cases are reported by Jack,[12] Miller,[13] Young,[14] and Jamieson.

Hartwell's paper may be taken as a reasoned verdict based on a large series of cases. As the vaccine had no effect on the urethral discharge, in all cases local treatment of the urethritis was used in addition to the vaccine-therapy. His vaccines were made from growths on hydrocele-agar slants killed by heating to 60° for an hour, or by allowing lysol (1–400) to act for twelve hours. No striking difference was observed in the effect of these two types of vaccines.

As a rule autogenous vaccines were prepared. He follows the usual practice, in acute cases, of giving small doses at frequent intervals, viz., 10 to 25 million, gradually increased up to 100 million if necessary, at intervals of two to four days. In chronic cases the vaccine was given at intervals of five to seven days, and the dose was often raised as high as 500 to 600 million. Immunity was not obtained with the first few doses, as fresh joints may become involved after three or four injections have been given, nor does the immunity eventually obtained last very long, as six of his cases had relapses and five became reinfected three to seventeen months after the cure. Better curative results were obtained with autogenous vaccines (19 good results out of 21 cases) than with stock vaccine (23 good results out of 30). In eleven acute polyarticular cases of simple hydrops, vaccine therapy diminished pain and hastened resolution. All recovered with good movement in the joints, except in three cases where there was previous disablement of the joints. He had nine cases of acute purulent or semi-purulent arthritis which were treated with aspiration, early massage, and vaccine therapy. The results were good: all recovered, and in only three cases were the joints more or less disabled. His series of thirty-one chronic cases represented typical examples of indolent crippling lesions left after the acute inflammation had subsided. In twenty the treatment was completely successful, good functioning joints without any disablement being obtained. The ankle joint and the small joints of the foot proved most resistant to treatment, and the same proved true of the painful areas on the plantar surfaces of the os calcis. Hartwell concludes that gonococcus vaccines are valuable in all stages of the arthritis except when ankylosis has occurred. They do not, however, seem able to prevent extension of the arthritis to fresh joints in the early cases, and certainly do not produce enough lasting immunity to prevent recurrence of the arthritis.

[It will be noted that Hartwell, in common with most other writers, seems to have combined vaccine therapy with local treatment of the gonorrhœa and of the affected joints. How far the improvement is really due to the vaccine is very difficult to determine. A small series of about a dozen cases of gonorrhœal arthritis which I saw treated with vaccines alone, did very badly, but improved as soon as the urethritis was treated and local treatment of the affected joints was instituted.—F. J. C.]

Hamilton[15] finds that treatment of gonorrhœal vulvo-vaginitis in young children by stock vaccine gave much better and quicker results than irrigation with antiseptics. The average time under active treatment by the vaccine method was 1·7 month, whereas with irrigation the average was 10·1 months. Under vaccine treatment 90 per cent of cures were obtained, with irrigation only 60 per cent. Hamilton used a stock vaccine, and irrespective of age, gave children over six months old an injection of 50 million gonococci. Increasing by 10 million each time, the injection was repeated every fifth day

until 90 million was reached, i.e., five injections, when the interval was increased to ten days. In most of the acute cases six injections were sufficient to effect a cure, but in the cases of longer standing, more injections were required, and the dose had to be increased up to 200 million.

Malta Fever.—Kennedy[16] has used vaccine treatment successfully in a very protracted case of Malta fever which had resisted all other methods. After using a large dose of 100 million germs without benefit, he tried smaller repeated doses of 6 to 7 million with better results, the temperature coming down within a few days, while the agglutinins in the blood increased.

Otitis Media.—Christie[17] has had excellent results from the use of autogenous vaccines in the treatment of acute and chronic cases of otitis media. Out of eighteen cases, only two were not cured, and these were of old standing and showed necrosis of bone. In all the others, a very good and rapid cure was obtained, though in most of them local treatment was stopped when vaccine injections were given.

Sill[18] treated 39 cases of otitis media in children with stock vaccines, and obtained 28 cures, and in 10 cases improvement. He notes that the earlier vaccine therapy was instituted after the onset of the discharge, the quicker was the cure. Young babies seem to require fewer injections than older children, especially if the discharge has only lasted a short time, but some quite recent subacute cases required prolonged treatment.

Pneumococcus.—Following up the article by Willcox and Parry Morgan, reporting twenty-four cases of pneumonia treated with vaccine, a few similar records have been published.

Craig[19] deals with a series of six cases of pneumonia which occurred in old men from sixty-six to eighty-three years of age. Despite the fact that the patients were mostly alcoholic, and with one exception suffered from chronic nephritis, all recovered under the vaccine treatment. This must be considered very satisfactory, as for the previous four years the mortality for pneumonia in the same institution had been two out of each three cases. The dose of vaccine was from 20 to 30 million killed autogenous pneumococci, repeated in from twenty-four to forty-eight hours as required. The cocci were grown from the sputum, and a stock vaccine was used till the autogenous one was ready. Though all the patients recovered, the course of the disease was not similar in all cases. In only two instances was the recovery rapid. One patient developed an empyema and required resection of a rib, in one case the disease ended by lysis, and in the other two cases the lung cleared up slowly and convalescence was prolonged. Leary[20] reports a series of 83 cases with a total mortality of 8 = 9·7 per cent. Of these, 34 were either alcoholic or serious cases, of which all but 6 recovered; of the remaining 49 cases of ordinary type, 15 per cent had their crisis on the third day and all but 2 recovered. These results are encouraging. The use of the vaccine relieved the toxæmia and diminished the delirium. The opsonic index was of

little value in controlling the treatment. Vaccines should not be given to moribund cases, as to do any good by vaccination the patient must be able to respond to the vaccine.

Nathan Raw[21] used pneumococcic vaccine in 28 cases of a severe type, of which 13 recovered. He thinks that on the whole the influence of the injections was favourable, but would like to preserve an open mind. [This corresponds closely with my own experience. I treated nineteen cases of acute lobar pneumonia with varying doses of a polyvalent stock vaccine. The results were not strikingly successful. Four cases ended fatally before the temperature fell, and a fifth case succumbed to exhaustion on the sixth day after the crisis. Complications seemed unusually numerous for such a small series of cases. Two developed empyema; one developed meningitis, and another succumbed to hyperpyrexia. On the other hand, in four cases a critical fall of temperature occurred within twenty-four hours of administering the initial dose of vaccine, and in four other cases a fall by lysis began within the first twenty-four hours of administration of the vaccine.—F. J. C.]

In a report on the vaccine therapy of the Manchester Royal Infirmary, Loveday and Ramsbottom[22] state that eight cases of acute pneumonia were treated: five recovered and three died, two of them from empyema. Three cases of chronic pneumonia were also treated, of which one recovered, one was materially relieved, and the other went home unrelieved.

Respiratory.—McWatters[23] states that in several cases of bronchorrhœa following acute bronchitis in old people, he has isolated a long, large streptococcus and the *Micrococcus catarrhalis*, and has obtained excellent results with vaccine treatment of these germs. The reduction in the quantity of the sputum was very rapid.

Sherman[24] believes that while Friedlander's bacillus, *Micrococcus catarrhalis*, *B. pyocyaneus*, and staphylococcus are often present in many diseases of the respiratory tract, the chief pathogenic factor is the streptococcus. In prolonged cases of influenza with severe bronchial, nasal, and throat trouble, the streptococcus is almost invariably present as the complicating factor, and streptococcic vaccine gives marvellous results. It is also useful in amygdalitis, and middle-ear and mastoid infections. In subacute bronchitis the results are usually very prompt, marked relief being noticeable a few days after the first inoculation. If rapid improvement is not obtained, the sputum should be examined bacteriologically for other organisms.

Rheumatic Fever.—Sherman[25] also claims marvellous results from the use of streptococcic vaccine in acute articular rheumatism. His statement does not, however, substantiate this, as he says, "In acute articular rheumatism, if treatment is started early, about four-fifths of the cases will begin to improve one or two days after the first inoculation, the temperature becoming normal, swelling and pain in the joints disappearing, and recovery taking place in from one to two weeks. Inoculations should be made at from four to seven days'

intervals." Streptococcic vaccine is also recommended in subacute and chronic rheumatism, the average dose being 30 million; but for arthritis deformans he gives a mixed vaccine of *Staphylococcus aureus* and *Staphylococcus albus* (100 million each) alternately with 30 million streptococcus at intervals of a week.

Persson[26] believes that acute rheumatism is a disease caused by micro-organisms, though the specific organism is still a matter of dispute. He has treated sixty-eight cases of acute rheumatism with vaccines of *Streptococcus rheumaticus*, *Staphylococcus pyogenes aureus*, or colon bacilli. No details of individual cases are given, but the results are summarized in the following table, from which it will be seen that cure was not so rapid as by treatment with salicylates.

	Number of cases	Opsonic index at beginning of treatment	Number of inoculations required for opsonic index to become normal	Number of inoculations required for a clinical symptom to become normal	Results
Streptococcus rheumaticus	47	·1 to ·4	18 to 43	36 to 61	cured, 32 improved, 8 unimproved, 7
Staphylococcus pyogenes aureus	14	·3 to ·6	22 to 51	31 to 76	cured, 3 improved, 7 unimproved, 4
Colon bacillus ..	7	·4 to ·7	26 to 40	30 to 63	cured, 3 improved, 1 unimproved, 3

The vaccines were prepared by growing the germs in sea water with the addition of nucleinic acid, and a daily dose of 20 million organisms was used.

Staphylococcic Vaccine.—Robertson[27] has found injection of staphylococcic vaccine of great value in the treatment of *Inflammatory conditions of the genito-urinary tract.* In old-standing cases of gonorrhœal infection, a fresh attack of inflammation is always associated with the presence of staphylococci in the urine, while the gonococcus may or may not be found. He holds that the gonococcus eventually loses its virulence and the mischief is kept up by the staphylococcus. It is in such cases that staphylococcus vaccine does good. He gives 400 million *Staphylococcus albus* every second day for three injections, and then at intervals of four to seven days as required. In his paper he records a small number of illustrative cases of acute prostatitis and cystitis with a history of gonorrhœal infection dating back from a few weeks to many years, and the recorded results of the vaccine treatment appear very favourable to his claim.

Rowlette,[28] in a clinical lecture on vaccine treatment, also states that in chronic gonorrhœal urethral discharges there is frequently

secondary infection with staphylococci, and advises staphylococcic vaccines in these cases.

In Glycosuria.—Mallanah,[29] in treating suppuration due to staphylococcic infection, noted the sugar output in the urine diminished during treatment. The same observation was made by Miller[30] with regard to three patients who, during local staphylococcic skin infection, developed glycosuria which disappeared or diminished with vaccine treatment. McWatters[31] goes further, and suggests that the lowered resistance to staphylococci so frequently seen in diabetes may not be due to the glycosuria, but that the glycosuria may be the result of the lowered resistance. He mentions four cases of glycosuria, all of which have had the glycosuria markedly diminished, while the quantity of urine has decreased and the patient has put on weight, under treatment with staphylococcic vaccine.

Standage and Russell[32] report an interesting case of *Staphylococcic cerebrospinal meningitis* in a boy aged four years, in which a cure was obtained by using large doses (250 to 400 million) of the specific vaccine.

Streptococcic Disease.—Graef and Wynkoop[33] report two very severe cases of streptococcic infection successfully treated by vaccines. The first was that of a boy with septic thrombosis of the lateral sinus, in which a cure was obtained without excising the jugular vein. The second case was even more noteworthy, as the patient exhibited marked signs of meningitis, and the spinal puncture showed a turbid cerebrospinal fluid containing streptococci.

Typhoid.—Russell[34] reports favourably of the prophylactic value of typhoid vaccine in the American Army. He has used it on 1400 men, totalling 3640 doses. The procedure is easily carried out, and very exceptionally produces severe reaction. It is, he considers, very doubtful if there is an increase of susceptibility to the disease following vaccination, and he thinks that it can be carried out in the presence of an epidemic.

Waters[35] gives briefly the result of vaccine treatment in 210 cases of typhoid fever, and contrasts the results with those obtained in 70 cases treated without vaccines. The average duration of fever in those not receiving vaccine treatment was 25·3 days ; of those receiving it 15·5 days, and the average residence of the unvaccinated patients in hospital was 57·6 days, against 39·6 for those who received vaccines. The number of relapses has been three times as great among the untreated as among those receiving vaccines.

Richardson[36] briefly alludes to a series of 28 cases of typhoid fever treated with vaccines (which only in two cases were autogenous). The dose varied from 10 million to 100 million, the average interval between doses being three days. The results were not especially striking, but the liability to subsequent relapse seems to be distinctly reduced. There was only one (atypical) relapse out of 25 patients treated with vaccine, while of 77 patients not receiving vaccines 10 suffered typical relapses. Nathan Raw[37] has used Wright's vaccine

in 11 patients, two of whom died of perforation and hæmorrhage. He cannot be sure that the vaccine was of any value.

Sir William Leishman[38] believes that the most reliable animal test of the value of a particular vaccine is obtained by the opsonic index, which is more reliable than agglutinins. While it is possible to modify the amount of protective substances in the blood by giving vaccine by the mouth, the results are extremely irregular, and we are without control over the system of immunization; consequently it is best administered by injection. In a comparatively small number of cases the typhoid vaccine has been used as a therapeutic measure in typhoid fever, with results which are distinctly encouraging. Using 300 to 400 million repeated every four or five days, there was a slight reactionary rise of temperature of 1° F. to 1½° F., followed next day by a considerable drop, which persisted for two or three days before it began to rise again gradually. On repeating the injection the same sequence of events was seen, and after three or four injections the temperature fell to normal and usually did not rise again. There was great improvement in the appearance and general condition of the patients.

Tuberculin-Rosenbach.—Rosenbach[39] has produced a new preparation of tuberculin. He finds that *Trichophyton holosericum album* grows readily when inoculated on a living culture of tubercle bacilli, and produces changes of a biochemical nature in the tubercle bacilli. Apparently, the more labile toxic properties of the bacilli are destroyed, while the more stable immunizing bodies survive. Consequently he finds that his tuberculin preparation differs in important respects from other tuberculins. It is a clear brownish fluid, obtained by extracting the mixed felted growth of fungus and bacilli with a glycerin-phenol solution. After filtration, this is added to the filtered culture medium and brought to a definite bulk. For healthy, non-tuberculous animals and men, the preparation is only very slightly toxic; but it exerts a powerful action on tuberculous subjects. He uses it either as a local injection into the diseased parts or as a subcutaneous injection into sound tissue. The local application is used for lupus and surgical tuberculosis. It produces a local violent phlegmonous reaction and a slighter general reaction. Within a few hours the diseased tissue begins to swell and become tense, while there is marked exudation and leucocytic infiltration. If the disease has not proceeded to caseation, granulation, or softening, the phlegmonous reaction gradually passes off, and a complete cure may be obtained by continuing the injections, e.g., in early cases of joint or tendon disease. But where such caseation, etc., has already taken place, the diseased tissues break down and heal after discharging the unabsorbable portions. Lupus responds readily, and usually heals up with the exception of small, resistant infiltrations which can readily be removed by surgical measures.

In pulmonary and other forms of tubercle not of a surgical nature, subcutaneous injections can be used. They act similarly to the ordinary tuberculins in exciting a selective influence on the tuberculous

tissue, consisting in a local reaction with some exudation and leucocytic infiltration, followed by the resorption and cure of the tuberculous tissue, provided there has been no caseous or granulation-tissue formation, in which case healing is slow unless the altered tissue can be discharged.

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VERONAL.

Friis-Möller[1] reports on the use of veronal in **Delirium Tremens.** He thinks that if the drug is given in the early stages it prevents or shortens the further course of the disease; but it has no effect if the delirium is already fully developed. Friedenreich[2] has been unable to satisfy himself that the drug has much effect in delirium tremens.

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RADIOLOGY AND ELECTROTHERAPEUTICS.

BY

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THE literature on these subjects has not been as extensive as in some previous years, but there has been no falling off in the quality of the material provided. No less than three Congresses have taken place on the Continent during 1910: The International Congress of Physiotherapy was held in Paris at Easter; while in September two congresses, both international, and devoted almost entirely to these subjects, were held at Barcelona and Brussels. A new application of the high-frequency current is one of the features of the year, and this attracted a great deal of attention at all the Congresses. By means of a special form of generator, which does not differ in any essential particular from the ordinary high-frequency apparatus, a high-frequency current of low tension and very large ampèreage is produced, and this, being passed through the tissues, heats them by virtue of the great volume of current. If one sends the current through the hands by means of a pair of ordinary handle electrodes, the heat can be rapidly felt in the hands and up to the elbows. Also the sensation of warmth is quite different from ordinary heat applications. It is felt to be internal rather than external. If suitable electrodes are applied locally, say to the lip, the part can be literally cooked *in situ* if desired. Long before this happens, however, coagulation takes place, the part is destroyed, and thrown off in due course. The method has been advocated for the treatment of malignant growths. Any part of the body may be heated, and this opens up a wide field of possibilities. At present we are only in the experimental stage. It has been found to have a sedative action in rheumatism, sciatica, lumbago, neuralgia, and painful affections of the bones and joints. It is also said to be particularly useful in gonorrhœal rheumatism, and that the joint can be internally heated sufficiently to destroy the gonococcus (which is very sensitive to a slight rise of temperature) and yet be unharmful to the joint itself.

A number of papers on "Diathermy," as it is called, have been published, but those most accessible are by M. Nagelschmidt and F. Nagelschmidt in the July and September numbers of *The Archives of the Röntgen Ray*, 1910. A very good paper was also contributed by the latter before the Royal Society of Medicine in October.

APPARATUS.

Induction Coils.—Beyond the special apparatus for the high-frequency current above referred to, there has been nothing of a strictly novel nature, but instrument makers and inventors have not been resting. Probably the most important feature in this direction has been the almost marvellous improvement of the induction coil, which now, for efficiency, heavy output, and freedom from inverse current, is far in advance of anything we have had before. Formerly, when we wanted a heavy current for rapid radiography, we had to use very large primary currents through an electrolytic break; apart from the waste of current, the amount of inverse current through the tube was very large in spite of valve tubes, and the life of the *x*-ray tube was very short in consequence. If a mercury interrupter were used, it easily consumed from ten to fifteen ampères of primary current and gave very little through the tube. Even at this current, mercury breaks were more or less inefficient, on account of the difficulty of obtaining the sudden and complete break that is necessary to the proper working of an induction coil. This is now a thing of the past. A coil in our own use, which is only rated as one of 12 in. spark, can easily send a current of 10 milliampères through an *x*-ray tube having a resistance equivalent to a three-inch air-gap, and this takes place with a mercury break and a current of about six ampères in the primary circuit. With a coil of this kind, exposures can be shortened all round without the life of the *x*-ray tubes suffering to any great extent. Thirty seconds will be found ample for the longest exposure, and with the use of the new intensifying screens this may be reduced to three or four.

These improvements have given us many advantages. Through the medium of a synchronous interrupter we can now do very rapid work direct from the alternating current supply, which is a great boon to those who have only this form of current available. Though it may be an advantage to a hospital to instal a motor-dynamo to meet special conditions, this is no longer necessary for the practitioner who specializes in *x*-ray work. These coils for use on the alternating mains are by Gaiffe, of Paris, and supplied by The Medical Supply Association. Those for direct current that we have tested were by Mr. K. Schall and Messrs. Newton & Co. Possibly equally efficient coils are supplied by other makers, but of this we have no personal experience.

A new type of coil has recently been brought out by Schall, and also by Dessauer, which calls for special mention. While it can be used with an ordinary interrupter and in the ordinary way when desired, it is also provided with a special interrupter and condenser, by means of which radiographs can be made with a single flash. In Schall's the interrupter is a modified dipper pattern, made to give only one interruption each time it is set. It is possible to re-set it so quickly that this single flash can be repeated every two or three seconds if desired. Dessauer achieves the same end by means of the explosion of a small cartridge in the circuit of a coil of similar

construction, which is sold in this country by Newton & Co. With an intensifying screen an excellent radiograph of the chest is obtained with a single flash. The spark is a thick momentary flame, and if this takes place a few inches from the body of the coil, it takes the form of a spiral-blade corkscrew as shown in *Fig.* 1. When the spark-gap is removed some distance from the coil and connected thereto by suitable wires, this "corkscrew" effect disappears. This would seem to indicate that the presence of a strong magnetic field is necessary for its production.

This making of radiographs by single flashes points the way to some special modifications in the technique of radiography. It is not improbable that we shall regulate our exposures, not by minutes, seconds, or fractions thereof, but in terms of so many single flashes

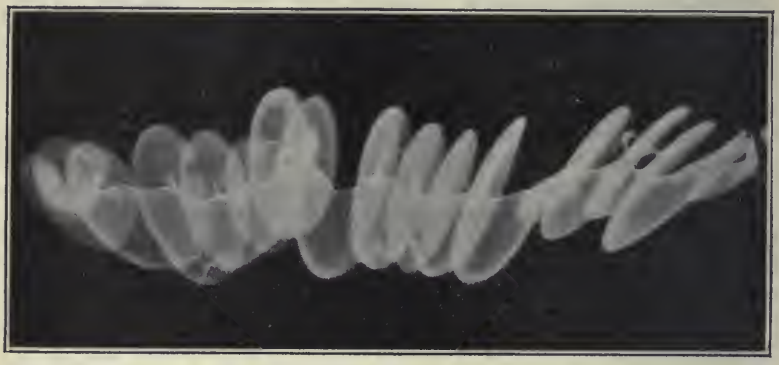

Fig. 1.—Single-flash spark from a new induction coil.

—a system that should prove more simple and more certain. We are carrying out experiments in this direction which promise success, though the difficulties are greater than one would imagine at first.

Intensifying Screens.—These have been with us for some time, but did not gain much in popularity owing to the coarseness of the "grain," which had an unpleasant effect on the plates. They were thus only used for making rapid exposures of the heart at long range (teleradiography); and as it was only desired to get a more or less accurate idea of the size of the heart, a certain amount of "graininess" was not much disadvantage. With improved screens this "grain" effect has been much reduced: so much so that they are applicable to almost all cases. It must be stated, however, that the quality of the radiograph suffers to some degree when even the best intensifying screen is employed, and thus their use is not advised except where some special reason exists for making the exposure as short as possible. It must be remembered that in most cases no distinct advantage is gained by very short exposures. The life of the

tube suffers disproportionately, and the latitude of exposure is much narrower. On the other hand, the constant use of the intensifying screen and only a moderate current through the tube enables many more radiographs to be done with the same tube. The new screens can be obtained from most dealers in *x*-ray instruments, and are moderate in price. It will be as well to correct one or two fallacies regarding them. We were told it was necessary to place them under the plate, and to turn the latter face downwards, so that the back of the plate was towards the patient. We are sure that this is not the best arrangement. The back of the screen should be next the patient, the screen and plate being face to face. Also it is not necessary for the screen or plate (whichever is farthest from the tube) to be backed with metal; in our experience this makes no difference.

It was also said that these screens would be useless in renal radiography. We and others have satisfied ourselves that this is not so. In several cases the presence of the calculus was all the more clear when the screen was used. Altogether these screens constitute a great gain to radiography, making more or less rapid exposures possible to those who have only the more ordinary apparatus at their disposal. That the screen exerted its full action only when excited with the rays from a very powerful outfit, is another fallacy. While it is claimed that these new screens will reduce the exposure to about one-fifteenth of what it would be without one, in our experience this is too small a factor to use with safety, though at times it will give fair results. We find that if the normal exposure be divided by ten, a very satisfactory plate is obtained. Of course, in teleradiography of the heart it is quite possible to give even half this amount; though the plate will be very much under-exposed, a sufficiently clear and accurate heart shadow will be obtained, good enough for practical purposes. It will be found that whatever factor is the best for any particular screen, this factor holds good for either normal or heavy currents through the *x*-ray tube.

It is not advisable to use an intensifying screen when investigating cases of bone disease, where it is important to show up the bone structure.

X-ray Tubes.—There has been a steady advance both in quality and reliability. The "Moment" tube of Gundelach (*Medical Annual*, 1910) continues to find great favour. We have one in daily use which has made over 1500 radiographs, and is still in fair condition, though the plates have recently shown a little loss of sharpness.

Two other tubes that have appeared more or less recently are worthy of special reference. The following descriptions are taken from *The Archives of the Röntgen Ray*, April, 1910.

The Clover-leaf Tube.—In the new American "Clover-leaf" tube the support of the kathode is hollow, which appears to have a good effect on the steadiness of the kathode stream. This may be due to the facility which a hollow kathode offers to the passage of the Kanalstrahlen. The antikathode target is formed from a special alloy, whose melting-point is said to be double that of platinum. The makers claim to

have exhausted all the metallic gases from the tube, so that the vacuum will remain practically constant during an exposure, even though some 18 to 20 milliampères are passed through the tube. Under normal conditions the tube is too hard for ordinary purposes, and a few sparks have to be passed through the regenerator before using it. This, however, is no great disadvantage, as the regulator can be left at the

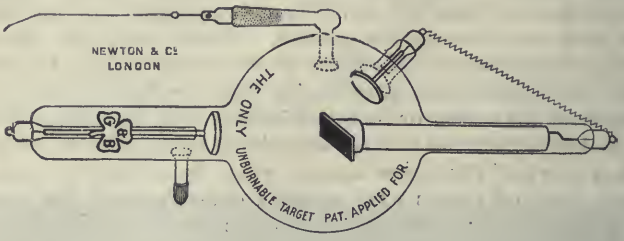

Fig. 2.—The "Clover-leaf" Tube.

required distance, and the tube thus automatically adjusts its vacuum. We understand that Messrs. Newton are the agents for this tube. (See *Fig.* 2.)

The Gamma Focus Tube.—As the accompanying diagram (*Fig.* 3) shows, the Gamma tube, designed by Bauer, is in many ways a new departure in focus tubes, and differs greatly in appearance from the older forms. The globe is made of extra thick lead-glass, so that all

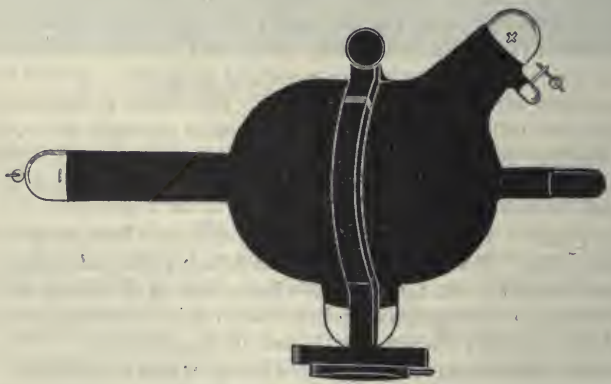

Fig. 3.—The "Gamma" Focus Tube.

auxiliary protection apparatus is superfluous. A very thin window of transparent glass gives exit to the cone of *x*-rays, which is thus but little diminished by absorption, a matter recently shown to be of importance in treatment.

Each focus tube has an iris diaphragm permanently attached to the bulb, in front of the thin transparent window. The antikathode target

is carried by the anode, and is of the usual Bauer air-cooled type. A third tube, in the position of the usual anodal neck, bears the gas-regenerating arrangement. The whole is covered with an opaque coating, to exclude the light for fluoroscopic examination, a window at the top permitting the continuous observation of the tube. The advantages claimed are the following: (1) The heavy lead-glass renders it less liable to accidents, implosion, or puncture. (2) The glass window, being small, can be made very thin without endangering the safety of the tube, so that a large proportion of the softer rays are available for therapeutic purposes. (3) There is no need for cumbersome shields and diaphragms, as the tube is perfectly safe when used with a simple stand, although it is made of the standard size, to fit any of the more usual types of enclosed tube-holders.

We might also mention that Gundelach has also modified his "Moment" tube by placing a metal hood around the antikathode. This has two holes in it—one opposite the kathode through which the kathode rays pass to impinge upon the antikathode, and the other opposite the point of impact for the emergence of the *x*-rays, only a central cone of the latter being allowed to escape. In action the appearance of the tube is very peculiar, but there is no question as to the soundness of the idea. It suppresses the useless and stray rays, which is good for radiography as well as for the radiographer. Any idea that makes for protection of the operator is to be encouraged. We have found one of these tubes behave in practice as well as the ordinary pattern, but they are not suitable for *very* heavy currents. We have not personally tried the "Gamma" tube above referred to, but we have had considerable experience of the "Clover-leaf" tubes, and we cannot speak too highly of their merits, though they require the exercise of certain precautions in use. These are fully explained in a little booklet supplied by the makers, Messrs. Green & Bauer, in America. The deplorable fact still exists that no maker in this country has yet succeeded in placing on the market a supply of *x*-ray tubes that are uniformly reliable.

X-ray Technique.—There is nothing very new to record. The use of the compression diaphragm is slowly but very surely gaining ground. We have adopted the method with advantage, and can thoroughly commend it. Of the various types, we prefer those of Albers-Schonberg, either as supplied or as modified by Mr. Thurstan Holland; we find the latter the more convenient. We are convinced that this method is the best in the detection of urinary stone, and the quality of the radiographs of any part of the body is of a highly satisfactory kind. The only part where it is not so valuable is the thorax, where we require a larger field than the tubular diaphragm usually permits. The tubular diaphragm has produced radiographs of the head and skull such as were not possible by other means. Many cephalic conditions can now be demonstrated in a more or less satisfactory manner.

Alternating Current Rectifiers.—Among the appliances lately introduced that will be of use to those who have an alternating current only

to depend on, is a new and simple form of rectifier for converting alternating into unidirectional impulses.[1] It is supplied by the Premier Ampero Electric Co., of Premier House, Dover Street, London, W., and will be found a useful and efficient apparatus for charging accumulators, such as are used for motor ignition and various kinds of medical work, wherever the current from the main is an alternating one. Its construction resembles that devised by Dr. Batten some years ago, but it is more efficient and rather more silent in action. A great feature is that the point on the pressure curve of the alternating supply, where the current is picked up and cut off, is adjustable, and can be arranged to take place at the voltage of the cells. At such times as the charging current is at a lower voltage than that of the cells undergoing charge, the circuit is open and no current can pass back through the rectifier. When properly adjusted, which is a simple procedure, there is no visible sparking at the contacts. On our visit we saw the instrument converting an 85-cycle alternating current into direct current and charging some ignition cells, and also running a small direct current shunt-wound electric motor, which latter, as is well known, will not work with an alternating current. If the main supply should fail, the instrument cuts itself out of circuit automatically. It will work on any periodicity in ordinary use, starts and runs on any load, requires no attention, and is efficient in any position. The makers claim that the instrument will go for six hours a day for six months without attention, and then all that is needed is a new set of platinum contacts at a trifling cost. The directions to be followed are extremely simple, and altogether we have seen no better instrument for its purpose.

A rectifier working on the principle of the Cooper-Hewitt Mercury Vapour Lamp has recently been brought out and appears likely to be useful for marking an *x*-ray set from an alternating current supply. No description is yet forthcoming, but it is claimed that the resulting current is very nearly continuous and can give up to thirty ampères if necessary. A vacuum bulb forms an essential part of the apparatus which has to be renewed at long intervals. We hope to be able to give the results of an extended experience with this device at a future time. It is supplied by Newton & Co.

Rhythmically interrupted currents are being increasingly used for therapeutic purposes. When we consider that rhythmical contractions are the rule in the various internal organs, it is only natural to suppose that a current having a tendency to set up similar contractions would find a large field of usefulness. At one time the slow sinusoidal current was a favourite one, but its generation at a sufficiently low frequency required a heavy and cumbersome machine, and special appliances for regulation of the current strength. Equally good results can be obtained from more simple apparatus, several of which are described in a paper by Lewis Jones.[2] Some of the appliances referred to are more or less elaborate, but the simpler forms are quite capable of doing useful work. A delightfully simple arrangement, that anyone can easily make for himself in a few minutes, is described by Aldridge,[3]

It consists of: (1) A test-tube, 6 in. by ½ in., standing in a hole in a block of wood; (2) A glass syphon, ¼ in. bore, one arm 5 in., the other 3 in., long; (3) Two triangular pieces of thin sheet copper 2½ in. long by ½ in. base. To each base is soldered a flexible insulated wire. The strips of copper are tied by silk to each side of the short arm of the syphon, reaching to within ¼ in. of the end. The syphon is now inserted in the test-tube and the apparatus placed under the tap. The wires are carried to terminals screwed into a shelf. By regulating the tap the test-tube can be made to fill and syphon itself from ten to eighteen times per minute with perfect regularity. One cord from the battery is attached to one terminal, and from the other a cord is carried to one of the electrodes to be used, the other electrode being attached direct to the vacant terminal of the battery. The current rises from zero when the tube has syphoned to maximum when it is filled.

LITERATURE.—Among the published works of the year we may mention the following:—

"Radium Therapy." By Wickham and Degrais. Translated by S. E. Dore. We referred to the original edition last year. The English translation will prove acceptable to many.

"Atlas der Anatomie des Mediastinum im Röntgenbilde." By Dr. F. A. Hoffmann. This work will be of great use to those who wish to perfect themselves in the interpretation of radiograms of the thoracic cavity.

"Atlas und Grundriss der Röntgendiagnostik in der innere Medizin." By Dr. Franz M. Groedel. A valuable addition to the diagnosis of internal disease, and the plates with which it is illustrated are among the most perfect we have ever seen.

"Medical Electricity and Röntgen Rays." By Sinclair Tousey, M.D. A full and complete work.

"Living Anatomy and Pathology (in Early Life, and as shown by the Röntgen Method)." By T. M. Rotch, M.D. This is one of the best and most important works that has come to our notice. Admirably illustrated, and we warmly commend it to those who are interested in children's diseases.

"Traité Pratique d'Electricité Médicale (Electrothérapie, Radiothérapie, Radiumthérapie)." By Dr. J. Larat, Paris. A handy and compact volume, giving the views and methods of our French colleagues.

A melancholy interest attaches to the appearance in this country of "Electro-Therapeutics and Röntgen Rays," by M. K. Kassabian, M.D., which coincided roughly with the lamented death of the author from the results of chronic *x*-ray dermatitis of an extensive character. A true martyr to the cause of medical science. This, the second edition of his work, is a worthy monument to the memory of a brave, industrious, and painstaking man. He was working hard at his duties to within three or four days of his death.

REFERENCES.—[1]*Lancet*, Oct. 30, 1909; [2]*Ibid.* Nov. 13, 1909; [3]*Ibid.* Jan. 1, 1910.

X-RAY DIAGNOSIS.

Diseases of the Bones and Joints.—Pirie (Dundee)[1] has contributed a useful paper on this subject. It is systematically arranged, and illustrated by excellent radiographs. He draws attention to the fact that in many cases of long-standing joint trouble, it is well-nigh impossible to get a good radiograph of the part, because there has been some absorption of the trabeculæ, and the bone being less dense is incapable of giving a good shadow. An even more comprehensive paper on the

subject is one by Granger,[2] which is also illustrated by radiograms of a high degree of merit. These two papers are worthy of careful study, as they give many points of differential diagnosis bearing on those conditions that are most likely to be confused.

Injuries and Diseases of the Head.—There is a growing tendency to make use of the *x*-rays in this connection, partly due to the greater reliance that is now placed on an *x*-ray diagnosis by the profession as a whole, and partly to the better quality of the radiograms. Tumours of the hypophysis, the sutures of the skull, and various abnormalities are now comparatively easy to show in a radiogram of the head. Lange[3] states that in *x*-ray examinations of the mastoid region the oblique postero-lateral view gives the clearest and most extensive mastoid profile. The pyramid is thus thrown forward, and the mastoid details, especially the groove for the lateral sinus, are shown better than in any other position. To obtain this view the patient lies on his side, with the mastoid resting against the plate, and the rays are directed from above (cephalad) and behind, entering obliquely just below the parietal eminence of the upper side, and pointing towards the mastoid process of the opposite side. The most favourable angle is obtained when the axis of the compression cylinder is tilted upwards (cephalad) at either 20 or 25 degrees according to the type of skull, from the plane of the skull-base (Reid's base-line), and inclined backwards 10 or 20 degrees from a plane passing vertically, when the patient is erect through both external auditory meati. Both sides must be skiagraphed, and if the exposure be under ten seconds, and a few minutes be allowed to elapse between exposures for a partial cooling of the tube, the same tube may advantageously be used for both exposures, to ensure equality of definition and penetration. The *x*-ray examination of the mastoid process is valuable in both its anatomical and its clinical aspect. From the former standpoint information concerning the mastoid may be gained that may prove of great value in operating in this region. The clinical aspect, especially in the milder acute cases, is on less certain ground. The chief field for research is to determine whether the milder pathological changes, such as inflammation and suppuration of the mastoid mucosa without gross bone destruction, will always show upon the skiagram, and whether indications for operation can be deduced therefrom.

Foreign Bodies in the Eye.—T. Nogier[4] advocates radiography when localizing foreign bodies. With a tube having a penetration of No. 7 Benoist, he takes his radiographs of the orbit in from two to eight seconds, according to the current the tube will stand. His method of localizing is simple, and while free from troublesome calculations is sufficient for most purposes. The patient lies on a radiographic couch, his shoulder resting on a pillow, and his head supported on a little stool 12 cm. in height. The head should be so inclined that the sagittal plane of the skull and the plane of the plate form an angle of 30 degrees. When the external orbital apophysis touches the plate the position is good. At the level of the occiput is a bag partly filled with sand.

Above the patient, supported by Guilleminot-Béclère's framework, is the Röntgen apparatus, with a pneumatic compressor. In the upright of the frame a pin is inserted, and a rapid radiograph is made while the patient's gaze is fixed at this point. Then the pin is placed at the other side of the frame and a second exposure is given. If both pictures show one or more spots in the orbit clearly abnormal, the diagnosis of one or more foreign bodies is made. Various procedures exist for determining the exact site of the foreign body. The simplest is that of judging by its displacements when shown at parallactic angles of the eye and the object. By this method a third radiograph is taken under the same conditions as the preceding ones, except that the eye regards a point at the centre and not at the sides of the frame. One has therefore three pictures : (1) The eye regarded from above; (2) From below ; (3) From directly in front. If, when the first picture is compared with the third, the object shows no alteration in position, it may be that it is intra-ocular but coincides with the centre of rotation, or—which is much more likely—that it is extra-ocular and to be found in the orbit. But when the object is shown to have been displaced, it is evidently intra-ocular, and by judging its position in the third picture as compared with the first, a little thought will enable one to ascertain whether it is in the posterior or the anterior segment. The author points out that all *x*-ray tubes are not equally good for this work. Extreme fineness of focus is the essential requirement, and certain tubes that are excellent in radiotherapy are of no value for radiography of precision. What, he asks finally, is the value of this method as compared with the ordinary procedure in ophthalmology ? If the eye is transparent, and the foreign body visible to the ophthalmoscope, the radiograph can add but little ; if, however, the eye is not clear—if there is hæmorrhage, for instance—the radiograph has a value of the first order. Moreover, while the sideroscope is excellent when fragments of steel, etc., are in the anterior segment of the eye, it is useless when they are in the posterior ; but extra-rapid radiography gives good results whatever the position, dimension, and nature of the foreign body.

Pulmonary Tuberculosis.—At the annual meeting of the British Medical Association two interesting papers were read by Orton[5] and Jordan,[6] in the course of which a very good case is made out for the more regular employment of the radiographic and radioscopic methods in the diagnosis of pulmonary disease. Many physicians decry the Röntgen method of examination, yet it is a frequent experience of radiographers that a diagnosis is not only modified but entirely altered as a result of a proper *x*-ray examination. The fact is, that to place anything like complete reliance upon any one or two methods is not justifiable. In doubtful cases we must use any and every means at our disposal to get at the truth ; and there is something to be said for a method which gives *visual* evidence of departures from the normal. That the appearances may be misinterpreted is no fault of the method, and is one that is tending to disappear.

With the advent of teleradiography (*Medical Annual*, 1909), the orthodiagraph is now seldom used except in few cases where accurate measurements are desired. Halls Dally[7] finds this instrument of the greatest use for mapping out infiltrated areas in pulmonary tuberculosis, and these examinations made at intervals of three months give positive evidence of the progress or arrest of the disease. He also uses it to measure the movements of the diaphragm, from which further information can be obtained that is of great assistance in forming a prognosis.

Cantlie[8] has just published two cases, illustrated with radiographs, in which liver pus was coughed up, one through the right and the other through the left lung. The differences in the two cases are very striking, especially the way the level of the diaphragm has been disturbed.

Desternes[9] has reported the case of a man who died suddenly after a radioscopic examination for stricture of the œsophagus. Bismuth was unable to pass the obstruction, and post mortem a fistula was found leading through to the trachea, but too small to have been responsible for the disaster. The bismuth, rejected by the œsophagus, must have been launched into the larynx, and in the very weak condition of the patient, caused a fatal result.

References.—[1]*Edin. Med. Jour.* May, 1910; [2]*Archiv. Rönt. Ray*, May, 1910; [3]*Amer. Quart. Roentgenology*, Dec. 1909, in *Brit. Med. Jour.* May 21, 1910; [4]*Arch. d'Elec. Méd.* Sept. 10, 1909, in *Brit. Med. Jour.* Oct. 23, 1909; [5]*Brit. Med. Jour.* Aug. 27, 1910; [6]*Ibid.*; [7]*Brit. Jour. Tuberculosis*, Ap. 1910; [8]*Jour. Trop. Med.* June 15, 1910; [9]*Bull. et Mém.* Mar. 1910, in *Brit. Med. Jour.* June 4, 1910.

X-RAY TREATMENT.

The field of *x*-ray treatment continues to grow along sound lines, as the literature of the year shows. For those who are new to this branch of medical science there is a good outline in a paper by Metcalfe.[1] He gives a brief statement of the treatment of the more common disorders that are beneficially influenced by this method, and while not countenancing any hasty neglect of the classical methods, makes a plea for the more frequent use of this form of treatment, which has given good results so frequently in cases that have resisted the older methods. For many years radiologists discounted the existence of individual susceptibility to *x*-rays, and with some reason. The opposite belief was formerly the more common one, and was no doubt due to the lack of any satisfactory means of measuring the dose of the radiation, so that where an excessive dose had been administered, the resulting dermatitis was attributed to the presence of an idiosyncrasy. With the introduction of several more or less reliable methods of measuring the dose of the rays the pendulum swung to the opposite extreme. To-day most workers are agreed that there is such a thing as abnormal susceptibility to the *x*-rays, but that it is not very common; also there seems to be little doubt that cases of unusual resistance are met with. This matter is of great moment to radiologists, and the

paper by Hall-Edwards[2] should be carefully read and studied; a dermatitis occurring in the course of an *x*-ray treatment may lead to the most awkward results, and one should be prepared.

Filtration has received a large amount of attention during the last few years, and has done much to put radiotherapeutics on a more scientific basis. For a great many cases that come under *x*-ray treatment the very soft rays that would be absorbed by the superficial layers of the skin are not required; in fact, they are most undesirable, owing to their property of causing dermatitis. Before the days of filtration, the appearance of dermatitis frequently put a stop to further treatment—often at a most inconvenient time—but since the use of filters has become more general, this gives us very little trouble. Numerous materials have been employed for this purpose, but to-day the tendency is to employ metallic sheets of definite thickness. For cutting off the softest rays a sheet of aluminium of about 0·4 mm. is sufficient, and this may be thicker or thinner according to the intensity and duration of the *x*-ray output from the tube in use. For cutting out all but the most penetrating rays, a much thicker sheet would have to be employed, and it is found more satisfactory to use a thinner sheet of a metal having a higher atomic weight; for this purpose none seems so good as silver. Sheets $\frac{1}{10}$ mm. in thickness answer extremely well. Silver has the property of stopping all the less penetrating rays, and at the same time allows a sufficient amount of the penetrating rays to pass without altering their character. A useful note on this subject is published by Emrys-Jones.[3]

Pirie[4] gives a useful paper on the method of treating those diseases that the *x*-rays deal with more particularly. He gives valuable hints as to the use of the Sabouraud pastille, and practical details in the treatment of ringworm, rodent ulcer, tuberculous glands, and many other conditions. The *x*-ray treatment of **Tuberculous Glands,** especially of the cervical region, is proving very satisfactory; and as the cosmetic results are all that could be desired, the method is coming more and more into favour. Further papers on this subject have been contributed by Lester Leonard[5] and Boggs.[6] These writers agree that no case is too far advanced to receive benefit, but that the earlier it is begun the better and more complete is the result. If none of the glands are broken down, a complete and permanent cure can be obtained in nearly all cases. If suppuration has taken place, the gland should be incised and the *x*-ray treatment begun the next day if possible.

It has been observed that lesions in other parts of the body, and outside the field of irradiation, frequently disappear during the treatment. In the paper by Lester Leonard, he says: "In one of the cases here reported, a Röntgen examination showed that in addition to the cervical glands the peribronchial glands were also enlarged. A second examination a year later, when the cervical glands were nearly normal, showed that the peribronchial glands had been entirely absorbed, although they had not been in the field under treatment. This was

also true of the post-cervical glands, which had not been treated on account of the hair." In cases of psoriasis, we have observed that active patches not directly exposed to the rays, greatly improved, and even disappeared entirely. In the face of these and many other similar observations, it seems that the following statement by Leonard is essentially true : " Thus there is evidence of a systemic effect which can reasonably be explained as the result of autogenous antitoxins or antibodies produced in the patient's system by the destruction of the tuberculous glands during the Röntgen treatment. In any patient having tuberculous cervical glands, it is therefore probable that efficient treatment will produce an autogenous vaccination which will destroy other foci and confer some degree of immunity."

We first referred to this matter in the 1909 volume, when discussing a paper by Crane which appeared in the *American Journal of Medical Sciences*, March, 1908, and we understand that a paper was published in the *Archives of the Röntgen Ray* in April, 1907, by M'Culloch. The editor of the latter journal makes reference to the question in a leading article, June, 1910, and also in August, 1910. It is a most interesting and important factor in radio-therapeutics, and one about which we shall hear much more during the next few years.

Pirie[7] has had good results in the treatment of that most distressing condition known as **Hyperidrosis.** The axilla is the most common site, and the perspiration is frequently not only excessive, but also has a most offensive odour. He finds that four measured doses are sufficient to keep the axilla dry for practically the whole day.

Nervous Itching of the Skin is another distressing complaint that frequently tries the patience of the sufferer and the medical attendant to their utmost limit. Schmidt[8] has found that the *x*-rays, applied in from a quarter to a half of the erythema dose, answer better than anything else. The relief is not immediate, but the effect is produced in from four days to a week and lasts for at least a month, and perhaps for many months or even years.

Meret[9] has contributed a case of **Suppurating Folliculitis Barbæ** that was cured by the *x*-rays after two relapses. The case was severe and troublesome to deal with, but the cure was complete.

With regard to the treatment of **Ringworm,** there is nothing new to report ; the *x*-ray method is now an established fact, and we have not heard so much lately about the possible deleterious action on the brain of the child. This is a matter that cannot be finally disposed of for many years to come. In view of the fact that the skull bones can absorb all or nearly all of the destructive rays, there is not likely to be much trouble in this way. The situation is discussed in a leading article in *The Lancet*, May 15, 1909.

Notwithstanding the safer method devised by Noiré (see *Medical Annual*, 1910), the *x*-ray treatment of **Hypertrichosis** does not seem to be gaining ground. The hair follicles being normal structures, by the time these are destroyed other structures of a normal character are bound to suffer also. The immediate effect is a parchment-like con-

dition of the skin which has anything but a normal appearance, and after some months, or even a year or so, there is a probability of telangiectases appearing, which are not preferable to the original condition. Rice[10] frankly states that the *x*-ray treatment is a failure. Our own belief is that the only safe way to bring about a satisfactory epilation by the *x*-rays that will be permanent and not unsightly is by a prolonged course of short applications from a hard tube, and a filter that will cut off all those rays likely to produce dermatitis. This belief is based on observations made in the course of a long experience in treating chronic and malignant cases. It is doubtful if patients would go through so much for the sake of removing a few superfluous hairs. Even with this method the risk of producing the withered senile appearance of the skin is not entirely absent.

In treating the more severe cutaneous diseases some radiologists advocate the use of massive doses of the *x*-rays, and this has been especially recommended by Broca.[11] He does not advise these large doses for the mild lesions, and points out that the operator must be a perfect master of his apparatus if disaster is to be avoided. He uses a dose of 8 H. in a case of **Lupus** at one sitting, and as much as 30 H. to a **Malignant Ulcer.** The greatest care must be taken to protect the surrounding skin. The results would appear to be satisfactory, but heavy doses have their disadvantages. Local œdema, and more or less severe constitutional symptoms, may follow from the absorption of toxins.

From time to time papers are published on the treatment of diseases of the spinal cord by means of the *x*-rays. They have been mostly isolated, and at long intervals of time. At the recent International Congress of Physiotherapy, Paris, 1910, two authors made an effort to bring all these scattered cases together, adding their own experiences: Beaujard[12] thinks that the results in **Syringomyelia** are extremely satisfactory considering the nature of the disease. He finds the motor and sensory troubles begin to ameliorate after the third or fourth weekly sitting, and the results seem to be permanent. He has also had good results in **Multiple Sclerosis.** He uses hard tubes, and gives a dose corresponding to 3 H. at a distance of 23 cm. from the skin. The other paper, by Marinesco, of Bucharest, reports similar results

Cases of **Paget's Disease** are sometimes offered to the radiologist for treatment, but it does not seem to be amenable in any degree to this method. In two cases where we tried the *x*-rays there was no improvement, either with large single doses or small ones frequently repeated. Lenglet[13] is also sceptical as to the value of *x*-ray treatment in this disease. The most that could be done was to bring about a superficial healing, and the rays were powerless to arrest the rapid and unexpected evolution of the deeper tumours beneath the irradiated zones. He considers that where the patient insists on the rays being used she should be told that in all probability surgical interference will ultimately be necessary.

Graves' Disease, on the other hand, seems to be very amenable to proper and systematic *x*-ray treatment. Thurstan Holland[14] and Schwarz[15] have reported satisfactory results. The nervous symptoms give way early, and an improvement in the general nutrition soon follows. The exophthalmos subsides, and there is a gain in weight. Schwarz admits, however, that the exophthalmos is a very persistent symptom, especially in cases of long standing, and this bears out our own experience. We have found that practically every case can be improved, some of them to a remarkable degree, but the exophthalmos was the symptom that gave the most trouble. Small repeated doses seem to have the most satisfactory results. The skin of the neck is very sensitive to *x*-ray applications.

Darbois[16] reports the case of a **Mediastinal Tumour** in an infant of three and a half months, causing dyspnœa, wheezing, and cyanosis since the first week of life. Radioscopically a tumour was found, about the size of a hen's egg, displacing the heart and also producing a curve in the vertebral column. Radiotherapeutic treatment was instituted, the dosage being 2 H. units with rays of 6 to 7 on the Benoist scale, first to the right and then to the left of the vertebral column, and 3 H. to the sternal region. Ten days after this single séance there were signs of distinct improvement; the dyspnœa had diminished and the cyanosis almost completely disappeared. Fifteen days after the first application of the rays, a second was given, identical with the first, and the pathological phenomena progressively cleared up, so that forty days after the commencement of the treatment the dyspnœa and cyanosis had vanished, the heart had returned to its normal position, the vertebral column had straightened, and the original ganglion had lessened until it was no larger than a small hazelnut. Dr. Darbois thinks the case is instructive, not so much from the point of view of the therapeutic result obtained, as from that of the radioscopic diagnosis. It is exceptional, he says, to see a ganglion or tumour in the mediastinum displace the heart and the vertebral column.

Beclere[17] reports a case of **Tumour of the Hypophysis** that has been benefited by *x*-ray treatment. The patient was a young giantess, 16 years of age, in whom the rays showed a notable enlargement of the sella turcica, and who suffered from violent attacks of cephalalgia, severe visual troubles, gigantism, genital infantism, and excess of adiposity. The case was irradiated entirely from the fronto-temporal region, by a system of cross-fire. The symptoms of pain in the head and the troubles concerned with vision were very greatly improved. The action on the trophic troubles was not so manifest, but the case was still under treatment.

Up to the present the field of obstetrics and gynæcology is one that the radiologist has not invaded to any serious extent, since the deep situation of the particular organs concerned make anything like efficient treatment practically impossible. The introduction of the *x*-ray filter, which has enabled us to give much greater doses to the

more deeply-seated parts, has altered this to a considerable extent, as an inspection of the literature of the last year or two shows.

Frankel reported a case where a **Pregnancy** terminated after an application of the *x*-rays, but there was no evidence to show that this would not have occurred in any case. Schmidt[18] gives the details of a case which was sent to him for this purpose. In spite of severe radiation causing some dermatitis, abortion had to be brought in the ordinary way. He therefore concludes that the *x*-rays are not suitable for this purpose. We think it right to record these instances as a guide to anyone who might be tempted to try the method for any reason.

Albers Schönberg[19] deals with the employment of the rays in gynæcology, and claims that they may be used to produce an **Artificial Menopause** for the following reasons: (1) To diminish the size of myomata; (2) To lessen or prevent hæmorrhages arising from myomata; (3) To remove pain due to myomata; (4) To remove preclimacteric hæmorrhages or pain; (5) To remove post-climacteric hæmorrhages. They are further applied to improve or cure the disturbances due to myomata, which arise independently of bleeding, and to treat menstrual disturbances, either with or without sterilization. The attainment of the artificial menopause, and in this way the diminution of the size of myomata, depends largely on the technique, on the situation of the tumour, and its nature. Intramural tumours are more suitable than subserous or pedunculated tumours. Very large old myomata, and especially if they are undergoing calcareous and other forms of degeneration, are not amenable to the treatment. The diminution in size takes place as a rule very slowly, and the patient herself usually notices the difference before the gynæcologist can determine it. Full absorption has not yet been achieved, although it has been possible to diminish the size of a myoma from that of a fœtal head to that of a small apple after sixty-eight and a quarter minutes' exposure to the rays. The author reports cases in which the symptoms—for example, dyspnœa, swelling of the feet, etc.—were entirely removed by means of the treatment. He has never observed a myoma to increase in size during the treatment, although diminution in size does not always take place. With regard to the hæmorrhages, the result of the first and second sittings is usually that the bleeding increases. The patients frequently report that the periods set in early and are more profuse than before. Intermenstrual hæmorrhages do not, as a rule, increase after the first application, and frequently disappear earlier than the menstrual bleeding. Great care must be taken with women who are blanched by previous losses, or whose hearts show signs of degeneration. The application of the rays in these cases may even lead to a fatal hæmorrhage. The menopause is achieved more readily in women over fifty years than in young women. Albers Schönberg states that the hæmoglobin content of the blood often increases rapidly under *x*-ray treatment. He finds that hard tubes and a water-cooling

apparatus yield good results. He has constructed two types of the latter, which have given him satisfaction.

Bordier[20] deals with the subject of *x*-rays in the treatment of **Intestinal Fibroma of the Uterus.** The difficulty has hitherto been that sufficiently penetrating doses of *x*-rays could not be directed upon the tumour without grave risk of radio-dermatitis at the point of entrance. The scientific employment of filters, however, has made it possible to augment the non-injurious dose, and it is by strict attention to filtration technique that Bordier has obtained his successes. He employs a Müller tube, cooled antikathode, rays of 9 to 10 Benoist, and aluminium filters from 0·5 to 1·5 mm. in thickness. At each séance he absorbs a dose which, measured under this filter, is sufficient to change a pastille to tint 0 on the Bordier colorimetric scale. (The palest colour tint, 0, on the Bordier scale is equal to an irradiation of about 3½ Holzknecht.) The séances are usually given at intervals of about two or three days between the menstrual periods. The results are, first, progressive diminution of the tumour, and, secondly, diminution of the menses, followed by total cessation. The growth of a fibroid tumour is connected with the circulatory activity of the uterus, and everything which tends to augment the uterine circulation increases the fibroma, and conversely. The *x*-rays certainly have a destructive action on the embryonic cells of the fibroma, but even more important as a factor in the cure, in Bordier's judgment, is the cessation of the menses which follows after a certain dose is received by the ovaries. It has been shown that the *x*-rays can sterilize the females of certain animals by atrophy of the ovaries, but, owing to the position of the glands, the action is generally regarded as much less certain than in the case of the testicles. Bordier shows, however, that careful filtration of the rays may bring about menstrual cessation without danger of radio-dermatitis. The necessary dose varies according to the age of the woman, and is smaller the nearer she is to the usual age for the menopause. The artificial menopause brought about by means of the *x*-rays is accompanied by the same general symptoms as the natural condition, and the grave consequences which sometimes follow hysterectomy are not met with. This last may be partly due to the fact that the rays produce cessation not suddenly but progressively.

One of Bordier's cases was that of a woman, aged thirty-nine, the mother of two children, who at the age of thirty-eight became aware of a large fibroid tumour in the uterus involving pain and hæmorrhage. A limited number of irradiations were made in series of three—that is, the rays were aimed successively in the right, middle, and left directions—and the changing to tint 0 under the aluminium filter was obtained in each instance. At no time was there any sign of radio-dermatitis, but only an erythema, followed by a brown pigmentation of the skin. During the first four months of treatment little change was observed in the size of the tumour, but the menses were less abundant; and when, after a rest from treatment during August

and September, the séances were resumed in October, the tumour perceptibly diminished, while the menses ceased altogether by March of the following year, and the fibroma was pronounced clinically cured. This condition has been maintained up to the time of writing (July of the same year). In this case 30 units I (Bordier's unit I is equal to about 2 Holzknecht units) were received on the skin, and Bordier estimates that the proportion of this irradiation received by each ovary after passing through 8 cm. of tissue was 3·3 units I. Two other cases are noted in which the cure was clinically established and an artificial menopause created (in one case after five series of irradiations in each of the three directions indicated) without any appearance of radio-dermatitis. Considering the large proportion of women who are afflicted with troubles of this nature, Bordier thinks that the method constitutes an important social progress, but he points out that the comparative facility with which the ovarian gland may be atrophied by Röntgen irradiations makes it imperative to interdict the employment of the *x*-rays by persons who do not possess a diploma in medicine.

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RADIUM.

The literature has shown a considerable diminution as compared with last year. With further experience, writers have become more cautious as regards their statements. At the same time we must remember that radium is one of the most remarkable substances that has ever been discovered in the history of the world. The more one learns about it, the more one marvels at its wonderful properties, and when it came to be used in the treatment of disease, the temptation to draw the long bow was well-nigh irresistible. If the medical profession find it impossible to bring a calm and sober judgment to bear on a matter of this kind, there is every excuse for the public not doing so.

A paper by Mackenzie Davidson[1] gives a good epitome of the history of the discovery of radium and its present uses in medicine. In the latter part are given details of several cases, of a more or less intractable nature, that had been greatly improved or even cured by radium applications.

Dawson Turner[2] has found it useful in rodent ulcer, angiomas, keloids, cicatrices and fibrous contractions, warty growths, simple

ulcers, malignant growths, and pruritus, and gives details of several case he has treated.

Löwenthal,[3] speaking of the action of the radium emanation on man, claims that this is chiefly absorbed through the respiratory passages, and is of definite value in the treatment of chronic inflammatory processes; in therapeutic doses it is quite harmless. He claims that in order to subject the body to the permanent action of radium emanation it is necessary to apply the source of emanation several times a day, since he has shown that the body gets rid of all traces through the urine and expired air within three or four hours, and, further, that since the greater part of the emanation is taken up by the lungs, it is necessary so to construct the baths that the nose lies within the space of the bath itself, and that violent ventilation should be avoided, so that as much emanation may be absorbed as possible. He now publishes some newer results of experiments which aimed at determining how the emanation acts. In the first place, he found that radium emanation is capable of activizing body ferments. The proof of this was furnished by experiments with various body tissues, collected in such a manner as to exclude all invasion with bacteria. These tissues were treated with radium emanation, and it was shown that autolysis was definitely delayed. He was also able to show that emanation influenced diastatic action, first by inhibiting and, after about the fourth day, by accelerating it. On the other hand, his experiments show that radium emanation does not affect bactericidal, antitoxic, and other biological actions. The action on the ferments would mean that the absorbing power of the body would be increased by emanation, and in this way the beneficial action on inflammatory processes may be explained. It is an old experience that mineral waters which have been bottled and exported do not act well on gouty and similar processes, while the same waters exercise a highly beneficial influence when fresh. This would suggest that something is lost in the bottling or standing. He believes that the emanation is lost. In order to strengthen this contention he discusses some experiments of Gudzent, who showed that uric acid could only exist in the blood as the monosodium urate. This substance exists in two isomeric forms: one of these is soluble, but little stabile (lactam urate); the second is stabile, but little soluble (lactim urate). The latter is present, according to Gudzent's analyses, in the blood of gouty persons. He further found that radium emanation is capable of preventing the transition of the less stable to the more stable form. Others have also shown that radium is capable of preventing the over-saturation and consequent deposition of urates in the blood. Löwenthal, therefore, concludes that specific urate-dissolving powers can be found in mineral waters. He questions whether some action may not be present as well by means of which ferments which form and destroy uric acid could be activized by radium. It can be shown that by drinking the radium-containing waters of Baden-Baden the excretion of urea is increased by 34 per cent, while that of urates is increased by 14 per cent, as compared with the excre-

tion when the person is drinking the same quantity of ordinary water warmed to the same temperature. Lastly, he has studied the question of which rays act in producing the effects dealt with. Emanation practically only radiates alpha rays, which have but little penetrating power, and are absorbed freely by air. Having studied this point with the assistance of a sample of polonium, which radiates pure alpha rays, he concludes that alpha rays, as well as the beta and gamma rays, exercise the curative ferment activizing effect in man. He explains late action on the ground of the alpha rays having this power.

Lauder Brunton and Glover[4] give the notes of a case of malignant disease of the vermiform appendix treated with emanations of radium. The notes are given very fully, and the case seems to show that there is a possibility that radium emanation may be useful in cases of **Inoperable Cancer** which cannot be reached by radium applied from the outside. This case is of further interest in that it was the first in which this method was employed. The injections were made with water that had been subjected to the emanations of radium for ten days—a solution of the emanation in fact.

Wickham and Degrais[5] have also experimented with the use of injections of solutions of radium, with results that appear to justify further investigation as to their possible value. They describe the method adopted in a case of lupus, and one of a cancerous nodule of the breast. In each case the result was exceedingly satisfactory, and had remained so at the time of writing.

Jordan,[6] by means of an ingenious device, obtains the emanation in sealed glass tubes, which he claims are as effectual as similar tubes containing crystals of radium bromide, except that the tube of emanation immediately begins to lose its activity, and has lost one-half at the end of four days. The filling of the tubes is an easy matter, and no matter how many are so filled there is no apparent diminution of the original stock of radium. These tubes of emanation he encloses in lead tubing of one millimetre thickness of shell, the ends closed over and welded up. The gamma rays, and also the harder beta rays, can pass through this thickness of lead. This metal tube is then enclosed in a piece of soft rubber tubing, and the ends tied across, leaving the string long at one end. A tube so prepared can be inserted into any of the cavities of the body, and left there for as long as is desired. The author claims that the results attained so far are very promising.

Abbe[7] has contributed two valuable papers on the surgical uses of radium. From his writings we gather that radium has its greatest field of usefulness in the treatment of the **Non-malignant or Slightly Malignant Growths,** especially when they are situate in the more inaccessible parts of the body. He describes cases of extensive intra-laryngeal growth, one of which had lasted for forty years, during which time the papillomata had been excised many times. Three applications of twenty minutes each at intervals of two months effected a cure. For this case 60 mgrams of pure radium bromide were used. He considers that any form of epithelial hypertrophy is amenable to

radium, and he also thinks that it acts almost as a specific in **Leucoplakia.** For sarcoma it acts very much more efficiently than for carcinoma.

This brings us to the question as to whether radium can in any sense be described as a cure for **Cancer.** In Abbe's[8] experience, small cancers on the skin, and away from moist surfaces, can be made to disappear by radium, and are to all intents and purposes cured, with a few exceptions. But when we come to examine what has been done in cases of cancer of the moist parts of the body, such as the mouth, œsophagus, rectum, uterus, etc., we are where we were before the discovery of radium.

Wickham[9] has come to practically the same conclusions, and considering his extensive experience there are some parts of his paper that cannot be too widely disseminated. Speaking on the question of the curability of cancer by radium, he says : " The use of radium is faced by numerous material and other difficulties and drawbacks, such as the following :—

" 1. If the cancer is voluminous and increasing rapidly in size, the practitioner has to deal with the following vicious circles : (*a*) The necessity of acting rapidly ; (*b*) The fear, when acting too rapidly, and with large doses, of causing toxæmia, and accidents of which he must be particularly on his guard, if he is not sufficiently experienced in the technique, in all cases of large cancers, for example, those of the abdomen.

" 2. There is no resource against metastatic growths at a distance : (*a*) Cancerous migrations by lymphatic vessels ; (*b*) Cancerous migrations by the blood-stream ; (*c*) Migrations by the serous surfaces ; (*d*) Migrations by the natural passages. Radium cannot at present have other pretensions than to act on lesions which are localized and sufficiently accessible, or rendered accessible. In cases with generalization, the resources of radium are limited to the reduction in size of the principal tumours, to the arrest of hæmorrhage and secretion, and to the diminution of pain.

" 3. If the cancer is localized and accessible, but inoperable, radium, with some rare but very remarkable exceptions, can only diminish or stop the hæmorrhages and secretions, and occasionally render the tumour operable ; but, in spite of these great advantages, which result in a prolongation of life, the patient, in the end, dies of his cancer.

" 4. The influence of radium diminishes as the tumour becomes less and less accessible. It is true that the rays of great penetrating power act at a depth without serious injury to the skin surface, but the results will be more uncertain as the tumours are less accessible. The few cases of inoperable cancer which were despaired of, and which I have been able to reduce and maintain, were all easily accessible (cancer of the parotid, of the glands in the neck, sarcoma of the shoulder, cancer of the rectum situated at a distance of less than 10 cm. from the anus, etc.).

" 5. Certain tissues are infinitely less favourably acted on by radium than others, for example, the mucous membranes, especially of the buccal cavity (tongue, tonsils, pharynx, etc.), and in these cases must be added the material difficulty of reaching the region conveniently, and applying the heavy screen-filters and leaving them in position for a sufficient length of time.

" 6. Lastly, if the cancer is very extensive, a radium-therapeutist has great difficulty in obtaining the stock of radium necessary to act sufficiently in every direction, for the number of doses needed in a number of cases is very high."

He then goes on to say that to speak in a general way of the cure of cancer by radium, without explaining circumstances, is to make use of unscientific language ; and that a too great enthusiasm in radium is apt to lead him who possesses it to use it too much, and thus deprive the patient of the benefits of other forms of reatment which have already proved their utility.

" When a doctor who possesses radium is consulted in a case of cancer he should proceed as follows :—

" (*a*). In cancers of the skin which are localized, superficial, non-inflammatory, and of rather small dimensions, radium is of great benefit, and he can, without exaggeration, assure the patient of a cure, but only on condition that the patient binds himself to ome once each month for a long period to see the doctor, to catch the first trace of any relapse ; but the patient must be told also that many other means exist—such as surgery, *x*-rays, etc.—which cure just as well.

" (*b*). In all other cancers, whatever their nature, the doctor must first consider if these other means cannot do better. If surgery can do better (as in excision of the breast for an operable cancer, or in excision of a commencing and operable cancer of the tongue, etc.), then radium can be suggested to consolidate the cicatrix after the operation ; treatment by radium is then an auxiliary to surgery, and I consider it better than the *x*-rays on account of the penetrating power of the radiations.

" If surgery is powerless because the cancer is too advanced, extensive, and consequently hopeless, then radium can be employed as a last resource to alleviate pain and prolong life ; it can also be applied after the chief part of the growth has been removed by the knife, but in those cases the patient's relatives must be duly warned of the temporary nature of the relief.

" If the surgeon cannot intervene on account of the seat or the depth of the lesions, then he can resort to the knife to open the way for the more direct application of radium apparatus (cholotomy, etc.) by means of a catheter.

" If the surgeon is unable to intervene on account, not of the gravity of the cancer, but because the condition or age of the patient prevent, or because he refuses an operation, then radium can be applied. It is in these rare conditions in which radium can be applied to less advanced lesions that this method should progress and show what

results it can produce, and give statistics which would warrant a bolder intervention in other cases."

In this connection it is interesting to note the discussion that took place at the Société de Chirurgie of Paris[10] on a paper submitted by Wickham on this very subject: In his communication, which was based on long and careful research, Wickham made a protest against exaggerations that have been produced in France and other countries. Radium, he holds, does not in the majority of cases effect more than an amelioration, and it cannot be said that it cures cancer. This conclusion was accepted by many speakers, including Delbet, Tuffier, and Lucas-Championnière. Other surgeons, and especially Morestin, take a less favourable view of the radium treatment, and, while acknowledging the possibility of relief, point out that several instances have been recorded in which, after apparent improvement, the disease has rapidly increased in growth, and presented more intense malignancy. Such facts would lead Monod to assume that radium, if it does not destroy the whole of the growth, may in some cases of cancer, do more harm than good. Moreover, they favour the conclusion that the surgeon ought not to waste time over radium-therapy when complete removal of the disease by the knife is possible. There seem to be good grounds for believing that the radium rays exert an elective influence on cancer cells and act, as Delbet expresses it, as a histological caustic having over other caustics the special advantage that it kills the neoplastic cells without injuring the surrounding connective tissue. After a brief discussion of the technique of the radium treatment of new growths, with special reference to the filtering of the rays, with the object of increasing their degree of penetration whilst preventing their irritating action, Monod gives in the following conclusions his impressions of the drift of the discussion: Radium exerts no more than a local action on cancer, and certainly cannot prevent spreading of the disease, recurrence, or metastasis. Its *rôle*, however, when it is properly applied, is very useful, and may prove of great importance, if it enables the surgeon to effect complete destruction of the disease. These conclusions should, it is stated, suffice to urge surgeons and radium-therapeutists to work together in perfecting the methods of application, and in thus obtaining the best possible results from this treatment.

The papers referred to so far have been contributed by those who practise the use of radium. We may now turn to a most important paper by Mr. Butlin,[11] in which this question is treated in a perfectly disinterested manner, and it forms perhaps the most valuable contribution to this vital question that is at our disposal. His observations are based on actual cases under his own care, or on those of others that he had opportunity to investigate personally. Did space permit, we would gladly insert the whole paper here, because we consider that the facts therein cannot be too well known. However, the paper is easily obtainable by anyone interested in the subject, and we advise its careful study. We quote from his conclusions:

"So far, then, as treatment by means of radium in London is concerned, it appears to be admirably adapted to **Rodent Ulcers** of small or moderate extent. The application is painless or almost painless. There seems to be very little danger to life or health. The disease seems to be quite cured, so far as we can at present judge, and the result is far superior to that which can be achieved by surgery. In cases in which the disease has attacked the bone or has made its way into the tear-duct or one of the accessory cavities of the nose, I do not know what radium will do, for I have not seen such a case treated by it.

"It is possible, by means of radium, to procure the healing of **Epitheliomatous Ulcers** of very small extent, and to remove the induration around the ulcers. The cure of such conditions appears to be as satisfactory as the cure of rodent ulcers. In cases of epithelioma of any but the smallest extent, in my experience we are not yet justified in advising patients whose disease is amenable to operation to try the effect of radium, unless there are circumstances in the individual case which render an operation inadvisable. So far as associated affection of the lymphatic glands is concerned, I have not yet seen anything which would warrant me in believing that the application of radium to the primary disease, even if it were successful, would avert affection of the glands, nor have I seen any case in which undoubted secondary affection of the glands was cured or decidedly benefited by the use of radium. Whether the application of radium over the glandular area before it is obviously affected will be found by-and-by to exercise a protective effect upon the glands I do not know. At present the glands must be treated as they have been hitherto, by operation.

"The results which I have seen of the treatment of **Leucoplakia** and allied conditions lead me to believe that radium only cures them by substituting thin scar-tissue for them, but does not restore the mucous membrane to the condition it was in before the development of the disease. Treatment by means of radium in such cases has, however, the great advantage over surgical removal or the use of destructive agents, that it is quite or almost painless, and that no actual inflammation and no open sore are produced by the applications when they are made by experienced operators.

"To medical men who are disposed to send their patients to Paris, where there is a much larger quantity of radium than we have here, and where the operators have, in consequence, had a larger experience and are undoubtedly very skilful, I would venture to suggest that they should obtain a written statement from the operator that, in his belief, the case which they take or send to Paris is a suitable case for radium treatment, and is likely, in the opinion of the operator, to be cured by means of radium. Such a course will guard patients and their medical attendants from disappointment which might otherwise occur from an incomplete acquaintance with a foreign language on both sides, and will give the operator to understand that the patient is not sent to Paris merely to be treated with radium in the hope that it may 'do some good,' but with the definite hope and expectation (on the part of the

patient, at least) that it will cure the disease to which it is to be applied. The tuberculin boom is still fresh in my mind, when patients in even the last stages of consumption were sent or rushed off to Berlin to be inoculated. Berlin did a fine business while the craze lasted, but many of the patients spent more than they could afford to do on a treatment which was purely experimental, while others died miserably in hotels and lodging-houses."

Lewis Jones[12] reports the results of his treatment of **Nævi** by radium, extending to twenty-four cases dealt with by this method. He used 15 mgrams of radium bromide, with a radio-activity of 500,000. It is enclosed in an aluminium capsule. He has cured twelve of these with a single application, while six had two, and the rest of the cases were still under treatment. As in other methods of treating nævi, he has found that the port-wine mark is the most resistant. The fact is, that the port-wine mark is composed of normal cells, and as such have the highest resistance to unfavourable influences.

In reading over articles dealing with the therapeutics of radium and the *x*-rays, we are struck with the frequency of the use of the term "selective action" when speaking of the influence of the radiations on the cells of adventitious growths. It has always seemed to us, that to ascribe to these radiations the power to single out the abnormal cell as its favourite objective, is carrying enthusiasm rather too far. It is generally admitted that the abnormal cell succumbs more easily to influences that are unfavourable to cell growth; but this is on account of their lower vitality, and not because of any selective action on the part of the unfavourable influence, whatever the latter may be. Given, then, a collection of normal and abnormal cells, such as a rodent ulcer, and apply to it anything that has a tendency to destroy cells, whether it be radium, *x*-rays, or freezing by solid carbon dioxide, and supposing that the dose has been properly adjusted and not excessive, all the cells that came under the influence of the agent suffer to a greater or less extent, as evidenced by the reaction that follows; but it is only the abnormal cells that are unable to recover. They die, and are removed in the usual way with such things. It was acting on this principle that we were induced recently to try the effect of freezing by solid carbon dioxide on a **Rodent Ulcer.**[13] These three cases are still to all appearances perfectly satisfactory cures in every way, and the method is one that has a very great deal to commend it, not only for rodent ulcers but for nævi and various local conditions.

At the annual meeting of the British Medical Association, Dominici[14] made a most interesting communication on radium therapy in malignant disease, and illustrated his remarks by means of several cases he brought over from Paris for this purpose. His cases were very striking, especially in the sarcomatous variety. They at least serve to illustrate the amelioration that follows radium treatment, but one would like to hear more of the subsequent history of these cases.

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ELECTROTHERAPEUTICS.

At the 1910 Congress of Physiotherapy, a very complete treatise on the subject of *muscular stimulation* by electricity was prepared by Laquerrière and Delherm.[1] After dealing with generalized stimulation of the body by Bergonie's method, in which large electrodes are used, and which is of special value in obesity and uric diathesis, they consider in fuller detail the various methods of localized stimulation in **Atrophies** and **Muscular Impotence.** In the case of muscles showing complete reaction of degeneration, the form of current which it is desirable to use differs with the different cases, but the authors believe that an interrupted galvanic current is the most convenient method of bringing about the contraction of muscles which are very degenerated. Electro-mechanotherapy, in which the electrical contraction is employed to move some outside resistance or to lift a weight, is proscribed, because muscular fatigue is thereby augmented. When the muscles show incomplete reaction of degeneration, Leduc's current appears to be a good excitant. In the case of muscles having no reaction of degeneration, belonging to a member which has suffered a violent traumatism, the faradic wave spaced out is the most agreeable and the best tolerated at the beginning of the treatment. In the later stages of the case, electro-mechanotherapy by means of the undulated current is indicated. It oftens happens in these cases that the muscular contractions made by means of the current are of smaller amplitude than those produced voluntarily, but the authors state that the voluntary contraction is due as much to the accessory muscles as to the muscle affected. Under localized electrization, on the other hand, only the affected muscle is excited, and it is its action alone which is registered. The different electrical modalities should follow one another more or less quickly in the treatment of muscular atrophies, but electro-mechanotherapy should only be applied upon those muscles which react well to the tetanizing current. In protopathic muscular atrophies the stimulation should be applied moderately, by preference in the form of brief, spaced-out faradic shocks. In infantile paralysis, upon muscles showing reaction of degeneration, rhythmic galvanization is advisable, and upon those presenting only a diminution of contractility the galvano-faradic current may be used. The static spark moved over the muscle is useful as an agent for restoring mobility in subjects whose sensibility is obtuse. In paralysis associated with hysteria, faradization constitutes an excellent re-educative procedure by causing the contraction of the paralyzed muscles. In comparing electrization with purely mechanical methods, the authors say that the current, quite apart from its value as a gymnastic exercise, and considered

from the trophic point of view alone, may be placed in an equal position to the best massage. In cases of severe **Neuritis,** when the nerve fails to transmit the voluntary excitation, in conditions of **Obesity** and **Hysteria,** and wherever mechanical exercises cannot well be applied, a localized electrical current enables the operator to bring about the individual contraction of such muscles as he pleases, and for as long a time and in such a manner as he pleases. The authors also state categorically that, other things being equal, the electrically provoked contraction causes a smaller amount of fatigue than the voluntary contraction.

Johnson[2] records a case where *anæsthesia* produced by electricity was used in a case for the **Amputation** of four toes. The patient felt absolutely no pain, even when healthy tissue was cut into. The anæsthesia was obtained by the use of storage batteries sending a current through electrodes placed over the nerves supplying the tissues to be anæsthetized. The negative electrode was applied over the sacrum, and three positive ones over the anterior crural, anterior tibial, and posterior tibial nerves. The capacity of the storage batteries was 100 ampères, and the current was interrupted 6,000 to 7,000 times per minute. Anæsthesia began as soon as the electrodes were applied, and there were no bad effects, the patient sitting up in bed two hours after the operation.

This indicates a possibility that electric anæsthesia may be usefully developed for minor surgery. For general anæsthesia this method has not found favour except in the laboratory, where it has proved, in competent hands, both useful and reliable. (See *Medical Annual*, 1909, 1910.)

Of all the conditions that a medical man is called upon to deal with, the most common is the relief of pain, and anything that can ameliorate the most obstinate of such cases is sure to command attention. Leduc[3] speaks very highly of the efficacy of the *introduction of salicylic ions by electrolysis.* One patient had suffered for nine years from periodical attacks of **Trigeminal Neuralgia,** the maximum intensity of the paroxysms being in the supraorbital nerve branch. During a crisis he could only lie moaning on a bed, unable to obtain sleep or to take nourishment, and after each attack he was rendered incapable of following his occupation for several days. Nerve stretching was carried out, but no relief followed, and many applications of the continuous current at high intensiy, with the positive electrode applied to the seat of the pain, were similarly unsuccessful. Salicylic ionization was then tried (20 to 30 m.a., forty minutes' séance), and this was repeated every day, with the result that although there was some shifting of the neuralgic pain to the gastro-hepatic region, the paroxysms quickly lessened in intensity, and within a short time the patient was able to return to his ordinary activities, suffering only very slight discomfort. Later, six further séances were given, and he became entirely free from pain. Another patient, who had suffered for more than thirty years from irregular crises of trigeminal neuralgia, and whose pain had been augmented by alcohol

injections, found his trouble completely disappear in the course of a single séance (25 m.a., one hour). As an instance of the rapidity of action of this treatment, Leduc mentions another case of inveterate trigeminal neuralgia, which had compelled the patient—a marshal of cavalry in the gendarmerie—to retire prematurely, and which was practically cured after a single séance of salicylic ionization. He brings forward also a case of neuralgia affecting the right eye, and accompanied by intense ophthalmia, the conjunctiva being much swollen. A thick wad of absorbent cotton impregnated with a warm solution of 1 per cent. salicylate of sodium was placed over the eye, and connected with the negative pole of the battery, a current of 10 to 20 m.a., being passed during forty-five minutes. Three séances per week were given, and improvement was noted from the beginning of the treatment, while twelve séances affected a complete and definite cure. This particular ion, according to Leduc, possesses the special property of relieving the pain of an inflamed wound. On several occasions he has dressed painful wounds with compresses impregnated with a solution of sodium, sterilized by boiling. He uses this dressing in connection with the negative pole of a generator, and passes 20 to 40 m.a., according to the nature of the wound, for one hour. Not only does the pain disappear immediately and completely, but this procedure also serves to disinfect the wound. The introduction of the penetrating ions has a regular and rapid efficacy.

Another very common and trying class of disorder that electrotherapeutists are asked about, is that relating to disagreeable symptoms connected with the hearing apparatus, such as **Tinnitus, Auricular Vertigo,** and, what is most common of all, **Deafness.** Zimmern and Gendreau[4] have been treating cases on lines which are somewhat different from those usually practised, with very encouraging results. They use both galvanic and high-frequency currents, and we notice that with the former very strong current was employed. In applying the galvanic current they use the negative electrode in the auditory passage, and the positive electrode upon the dorsal or lumbar regions. The ear electrode, with the help of a pledget of absorbent cotton, is extended as far as possible to the tympanum. The mean intensity of the current employed is from 15 to 20 m.a.; each application lasts from twelve to fifteen minutes, and takes place three times per week. In the case of the effluve or spark, each application lasts four or five minutes. In this fashion 22 patients have been treated, 16 of whom were suffering from otitis sclerotica, characterized by deafness and singing in the ears. In 5 of these 16 patients auricular vertigo was also present; these 5 were treated by the galvanic current, and in each case, after between six and ten séances, the dizziness disappeared. One lady, for instance, had double otitis sclerotica, which had been going on for two years, and in June, 1908, the attacks of dizziness became so severe that she had to cease all employment. The first séance of galvanic current was given on November 13th, 1908, and after the second séance, on December 19th, the dizziness had disappeared. On January 1st, 1909, she was re-

attacked by dizziness, but, following two séances of galvanic current on the 4th and 6th of that month, she remained entirely free from the trouble up to the time of preparing the report (July 25th, 1909).

With regard to singing in the ears, the results have been less remarkable. The condition disappeared in 5 patients out of the original 22, became scarcely perceptible in 9 others, but showed no improvement at all in the remaining 8. Of the 5 patients who were cured, 4 had been treated by the currents of high frequency in the form of condensed spark in the auditory passage, and the fifth by galvanic current followed by high frequency.

As to the deafness, marked improvement was obtained in 10 of the cases ; in 4 others it was less sensible, being about 15 or 20 per cent. ; in the remaining 8, in spite of a number of séances varying between thirty and fifty, no modification was obtainable. One patient, aged 55 years, who had suffered from deafness of the left ear since infancy, following upon otorrhœa, and had experienced a diminution of auditory sharpness in the right for five years, heard a watch tick (before treatment 1 cm. to the right, 0 cm. to the left, and a tuning-fork 80 cm. to the right, 0 cm. to the left. ; after the fifty-sixth séance the watch was heard 45 cm. to the right, 0 cm. to the left, and the tuning-fork 2½ metres to the right, 20 cm. to the left.

The authors think that the galvanic current acts in two ways : (1) Upon the circulation, producing an intense peripheral vaso-dilatation which has the effect of decongestionizing the labyrinth, and (2) on the sclerotic tissue of the middle ear. They advise the treatment of a case of auricular vertigo by galvanic current before having recourse to any other method. In dealing with deafness and singing in the ears, it is useful to follow up the applications of galvanic current with high frequency. The electrical treatment should be instituted when the patient is first aware of singing in the ears, before there is pronounced loss of auditory sharpness. If the condition dates back for some years and is connected with old lesions of the middle ear, it is difficult to obtain complete disappearance of the trouble.

Morton[5] contributes a comprehensive paper on the treatment of **Nævi** by various electrical methods. His experience extends to over 2,000 cases of all kinds, the most common being the capillary. He is of the opinion that every case can be vastly improved, and many, if not most of them, completely cured : that is to say, the resulting scar will be so slight as not to constitute a disfigurement. Given time and patience, every nævus can be made to disappear, though in the worst cases the resulting scar will always remain visible. The details of his procedure are very fully explained, and towards the close of the paper he introduces the use of solid carbon dioxide as a substitute for the electrical methods in some circumstances.

Bailey[6] reports some very satisfactory results obtained in the treatment of **Fibrotic Deposits, Thickenings,** and **Chronic Rheumatic and Rheumatoid Arthritis.** The following is an abstract of his paper taken from *The Lancet* : It was necessary to increase the supply of

arterial blood to the joints and to drive iodine ions into the affected parts, to effect a solvent action on the fibrous deposits. In employing radiant heat there should be provided a large radiant heat projector, with lamp at 100 volts taking 12 ampères, giving a temperature up to 400° F., but capable of being varied and modified down to the patient's " bearable point." Twenty minutes' " baking " was needed. As to iodine ionization, the following particulars were given. The solution used was a very hot 2 per cent solution of lithium iodide with an excess of iodine present (sherry colour). Baths of hot solution to joints (where applicable) with double carbon electrodes in fluid ; or pads and bandages of lint soaked in hot solution fixed round joints, covered with chain-mail copper electrodes, and bandaged on. Methods of getting the density of current approximately equal over surfaces of skin :—Area of electrode : knee, 500 square cms. ; shoulder, 450 square cms. ; hand, 200 square cms. ; foot, 300–350 square cms. Steady constant current, negative pole to part requiring treatment. Knee to foot, 30–40 m.a. ; arm to hand, 25–30 m.a. ; shoulder to hand, 30 m.a. The average current density in the case of the hand was 0·15 m.a. per square cm., but the maximum in parts might be 1·5 m.a. per square cm. ; that of the foot was 0·1 m.a., while the maximum might be 1. Cautions necessary to be taken were to avoid the current crossing the spinal cord, and to use every effort to prevent sudden variations in current. Duration of treatment, twenty minutes. Daily applications for four weeks if necessary; afterwards, if necessary, on alternate days. Value, and explanation of value, of taking iodine preparation internally during treatment if patient can do so. Movements to stretch the adhesions should be exercised as soon as possible after each treatment, and exercises should be carried out between the applications. The following analysis of 21 cases was given : cures, 28·6 per cent ; relieved, 57·2 per cent (19·06 per cent very greatly) ; no improvement, 14·2 per cent.

Lewis Jones[7] has drawn attention to the great value of zinc ions in the treatment of some **Corneal Ulcers,** especially those known as Mooren's ulcer. (See EYE, THERAPEUTICS OF.)

Somerville[8] enters a protest against the present neglect of high-frequency treatment, and shows that this neglect is not justified. As he rightly points out, it is not the fault of the treatment if some people claim too much for it before its actual value is known. He shows how the pain of neuralgias, after fractures, sprains, muscular rheumatism, and many other painful conditions is ameliorated.

In no field of medical work is electrical treatment of greater use than in that of **Gynæcology.** A masterly exposition of its value has been given by Sloan.[9] His experiences extend over a wide range of diseases, and his results are very satisfactory. The paper is too long even to be abstracted here, and should be read in full by those interested in this important subject. Curtis Webb[10] also speaks highly of the use of electricity in some gynæcological conditions, and these two papers form a valuable addition to our knowledge. Pitcher[11] has found the

constant current very useful in disorders of menstruation, and by applying the current scientifically, and with regard to the pathological conditions present, the results are quite satisfactory. In certain of the cases he has found static electricity more useful, especially for ovarian pain, and chronic congestion or even inflammation. That electricity has a real value is shown by the fact that gynæcologists have for the most part taken over the electrical treatment of their cases themselves, instead of handing them over to the electrotherapeutist.

Voorthuis[12] has given an excellent demonstration at the Royal Society of Medicine on the therapeutics of static electricity, making special reference to the method of Suchier, where the static brush has been found so successful in the treatment of **Lupus** and other obstinate local conditions. This form of electrical treatment is sure to come more into use as it becomes better known.

In the *Medical Annual*, 1910, we pointed out that *fulguration* as a method of treating cancer was to all intents and purposes a failure. Such investigation as has been carried out since fully bears this out. Schulz[13] and Davidsohn[14] have been looking into this subject, and they have failed to find any positive evidence that fulguration can in any sense be considered a cure for any form of malignant disease, the word "cure" being used in its strictest sense. It has a destructive action, and anything of this kind can bring about an apparent cure in certain cases; but we feel that the use of the term "cure" under such circumstances is not justifiable. Schultze[15] in a paper recording his experiences with the method, says: "As for ourselves, our failures have compelled us, for the present, to abandon the treatment." They consider *x*-ray treatment as much more valuable and more pleasant to both patient and operator.

In view of the evidence at our command, it seems that we are justified in emphasising what has already been said, that no case has been made out for fulguration as a cure for cancer. At the same time the high-frequency spark, which is a mild form of fulguration, has some very important uses, which we have referred to in previous years.

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HORMONES.

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The health of the body demands the mutual dependence of the constituent parts. A thoroughly independent tissue is rightly termed a malignant growth. As in human society, the parasite is of necessity pathological. The members of the body must exhibit a sublime altruism if the body is to wage successful war against its enemies. It is in social order, not in anarchy, that an analogy is found ; in mutual support rather than in selfish isolation. Just as there are anatomical relations between the organs fundamental to the form of the body, so there are physiological relations fundamental to its life. The anatomical relations are the basis of physical continuity ; the physiological, of vital unity. What is the nature of this unity, what are the bonds that bind ?

An answer to these questions was found first in the nervous system. The central nervous system is a master whose sway extends to every organ, and to whom every organ can appeal. The co-ordinating mechanism of the nervous system furnishes one foundation for the vital unity of the body.

Yet it is not on the nervous system alone that a complete answer is to be found. In the lower forms of animal life, in which a nervous system is absent, this unity still exists. It would seem that the nervous system which has developed in the higher forms of life was an additional aid to this unity, rather than its primary cause. The nervous system is not the sole co-ordinating mechanism, it is merely a refinement added to one of much more ancient lineage. This primitive co-ordinating mechanism which persists in the higher forms of life is dependent on chemical messengers, or, as Starling has called them, *hormones* (ὁρμαω, I arouse or excite). It is to Starling and his fellow-workers that we are largely indebted for our knowledge of these bodies. They are not highly complex bodies such as ferments or toxins, but, as Starling states, " well-defined chemical substances, highly unstable in most cases, but capable of analysis and, in some cases at any rate, of artificial synthesis." They are formed in one organ of the body and carried by the blood-stream to another organ or to other organs, there to excite physiological activity by their presence. Since the blood is their means of transit, a most important distinction can be drawn between hormones and nervous co-ordination. A nerve impulse in a warm-blooded animal travels at 60 metres a second, whereas a hormone can only travel at the rate of the blood-stream, that is, at the rate of a small fraction of a metre a second. A hormone mechanism is therefore unsuited in cases where a rapid response is essential, whilst

the nervous system is eminently adapted to such an end. The postal and the telegraphic services well illustrate these two mechanisms. Where speed is needless, the leisurely hormone is utilized; but where speed is called for, the nervous system comes into play. This is exemplified by the alimentary canal. Immediately after food is taken into the mouth, saliva is needed to aid mastication and deglutition; there is no time for delay, because a very short interval elapses before the food is swallowed. Here a nervous mechanism is required, and is found to exist. On the other hand, the food remains for some considerable time in the small intestine, and, accordingly, there is nothing to be gained by an instantaneous flow of pancreatic juice on the arrival of the chyme from the stomach. A hormone mechanism would fulfil all requirements, and it is a hormone mechanism that is in operation.

The vascular system, by virtue of the hormones which it distributes, must be regarded as one of the co-ordinating mechanisms of the body, and a mechanism which is utilized as a means of communication whenever a very rapid response is unnecessary. As research extends, the importance of these hormones becomes more manifest, and at the same time more and more bodies are discovered belonging to the class; a fresh chapter of physiology has been opened, and new light is constantly being thrown on old problems. Meanwhile, medicine gains by the addition of physiological remedies in the place of empirical drugs.

A detailed description of individual hormones is best given in association with the organs or tissues from which they are derived.

Duodenum and Jejunum.—It was the discovery by Starling of a hormone in these portions of the alimentary canal that focused investigation on the subject of chemical messengers. It was previously known that the introduction of acid into the duodenum was followed by a flow of pancreatic juice. Starling began his researches from this primary experiment. He isolated a loop of intestine from the upper part of the jejunum and destroyed all nervous connections between this loop and the pancreas, the loop being connected with the body solely by its blood-vessels. The introduction of acid still produced a flow of pancreatic juice. A nervous reflex was, therefore, excluded. Again, Wertheimer had shown that the injection of acid into the blood caused no flow of pancreatic juice. Hence the above flow must have been due to the action of acid on some substance in the mucous membrane. The crucial experiment was then performed of pounding up scrapings of the mucous membrane of the loop with hydrochloric acid, filtering the mixture, and injecting the filtrate. A flow of juice followed. The substance in the mucous membrane before the acid has acted on it was termed by Starling *prosecretin*; the action of the acid is to convert it into *secretin*, and throw it into the blood. This action has been shown to be of the nature of hydrolysis. In addition to hydrochloric acid, soap has the power of converting prosecretin into secretin. It thus comes about that fat, which causes no flow of gastric juice, and thus does not lead to the secretion of hydrochloric acid,

independently produces a flow of pancreatic juice when converted into soap.

It has subsequently been demonstrated that secretin does not produce a flow of pancreatic juice only, but also of bile and succus entericus. It is the hormone which excites the flow of the three juices which are poured into the small intestine.

Stomach.—Edkins has demonstrated that if the mucous membrane of the pyloric end of the stomach be boiled with acid, water or peptone and then injected into the jugular vein, a flow of gastric juice is produced. Thus there is a gastric prosecretin which by these agents is converted into gastric secretin. Further, the secondary flow of gastric juice which occurs after the food has reached the stomach is not due, as Pawlow thought, to a nervous reflex, but to a hormone mechanism.

Muscles.—Muscular exercise leads to the increased production of carbon dioxide, and this carbon dioxide, reaching the respiratory centre in increased pressure, acts as a hormone, in that it excites the respiratory centre to greater activity. The exquisite sensitivity of the respiratory centre to this stimulation has been shown by Haldane. This fact is of therapeutic value in that apnœa can frequently be cured by the administration of carbon dioxide mixed with air or oxygen by means of artificial respiration. Care must be taken that the heart is in a satisfactory condition, for carbon dioxide has a deleterious effect on a failing heart. It is best, therefore, before utilizing carbon dioxide, to perform artificial respiration with oxygen which has been passed through absolute alcohol. This has a stimulating effect on the heart.[1] When the heart has recovered, carbon dioxide can be administered, if respirations do not begin spontaneously. This method of treatment is peculiarly applicable to apnœa following overdoses of chloroform.

Thymus.—Many facts suggest that the thymus gland secretes a hormone especially influencing the lymphoid tissue of the body. Rachford, in a paper on the treatment of status lymphaticus by *x*-rays,[2] writes, "It would appear that the excessive physiological activity of the thymus gland bears the same relationship to status lymphaticus that excessive activity of the thyroid gland bears to exophthalmic goitre." He adds, "An increase or perversion of its internal secretion . . . is responsible for the general hyperplasia of lymphoid tissue, the lymphocytosis, and general feebleness of constitution which occurs in this disease." He considers that the normal thymus gland exercises an influence over the lymphoid tissue of the body.

Stores, Rohrer, Dudgeon, etc., have found primary marasmus associated with thymic atrophy. If we are to regard this atrophy as the cause and not the result of the marasmus, a thymic hormone influencing metabolism would appear to exist.

Warthin states that "In true acephalic monsters the thymus may be entirely absent, and up to the present time such cases are the only ones in which a total absence of the organ has been proved to exist." This suggests an influence of thymic secretion on intra-uterine development.

Lucien and Parisot found that the removal of the thymus in very young rabbits produced a marked retardation in their growth. The skeleton was diminished in size, the testicles or ovaries sharing in this hypoplasia. These changes did not follow thymectomy in animals that had attained their full growth. Paton, however, states that removal of the thymus in guinea-pigs at a period of life before it atrophies, is followed by a more rapid growth of the testes. This latter observation falls into line with the fact that in sexually active animals, such as bulls, the thymus atrophies rapidly, whereas in castrated animals, such as bullocks, the atrophy is retarded. In other words, the size of the thymus varies inversely as sexual activity. This forms but one of many examples of the mutual dependence of the glands with internal secretions. The relationship of the thymus to sex is also indicated by the fact that it progresses in size to the age of fifteen, when it begins to retrogress. To summarize, an excess of thymic hormone leads to increase of lymphoid tissue, a deficiency to faulty metabolism and deficient development; at the same time these would seem to be an antagonism between the thymus gland and the internal secretion of the mature testis and ovary.

The embryology of the thymus at present throws but little light on its function. It is still uncertain whether it be entirely epithelial in origin (Hammar), or whether it be in part of a true lymphoid nature (J. Beard). But whatever its origin may be, we can at least declare with certainty, from the fact of its retrogression, that its hormone ceases to be required in adult life. It is a hormone of growth and not of maturity. It is to be expected that the profound changes that occur in the transition of boy to man, and girl to woman, should be accompanied by the loss of certain hormones and the gain of others.

The Pituitary Body.—There is a developmental, anatomical, and physiological difference between the two lobes of this gland. Schäfer has shown that the posterior lobe contains a hormone which raises the blood-pressure by causing vasoconstriction, at the same time producing a diuretic effect on the kidney. Whether this latter is due to renal vasodilation or to a direct action on the kidney epithelium is uncertain. The raised blood-pressure following the injection of the extract is more permanent than that following adrenalin. A dilatation of the pupil occurs as in the case of adrenalin. A second injection following the first before the effect of the first has disappeared, causes no secondary rise of blood-pressure, thus distinguishing its action from that of adrenalin. Boiling does not affect the action of the extract, and so the injection can be sterilized. It is well to note that repeated injections are very injurious, and may prove fatal.

The results of total or partial removal of the gland in dogs have been carefully studied by Cushing and Crowe.[3] They found that complete removal of the gland led to death in the course of a few days, or at the most a few weeks, death being preceded by a peculiar train of symptoms (cachexia hypophyseopriva). Young dogs survived the operation longer than old ones. The removal of the posterior lobe

alone led to little or no symptoms. Partial removal of the anterior lobe produced very marked changes, notably an increase in the deposition of fat, sometimes associated with polyuria and transient glycosuria, shedding of hair, and lessening of sexual activities. Cushing states that "it is impossible to remove the hypophysis without producing marked alterations in all the other ductless glands, thyroid, parathyroid, adrenal, testicle, ovaries, islets of Langerhans, and thymus."

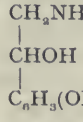
In regard to the results of excessive secretion of the gland, an enlargement of the gland is sometimes associated with that remarkable condition to which Pierre Marie gave the name of acromegaly. Yet these two conditions are not always associated. However, this is not surprising when it is remembered that enlargement of an organ does not necessarily imply excessive activity, and it is to excessive activity that acromegaly is probably due. Meige expresses the opinion that excessive activity of the anterior lobe occurring in youth leads to gigantism; in adult life, to acromegaly.

On the other hand, diminished activity of the gland leads to adiposity and sexual infantilism. Such symptoms may be produced by tumours in the neighbourhood of the pituitary, which tumours Cushing suggests may diminish the secretion of the gland. V. Eiselberg has brought about a marked amelioration of these symptoms by the removal of tumours in the neighbourhood of the pituitary.

Cushing advises the administration of the anterior lobe for the adiposity caused by deficient secretion, and, if necessary, the removal of any tumour pressing on the gland. In cases of excessive secretion he advises the *partial* removal of the anterior lobe.

To summarize: excessive secretion of the anterior lobe occurring in youth leads to gigantism; in adult life, to acromegaly. Deficient secretion of the anterior lobe occurring in youth leads to deposition of fat and infantile sexual characteristics; in adult life, to the loss of the acquired signs of adolescence. The hormone of the anterior lobe of the pituitary body, in short, increases the katabolism of fat and the growth of bones, at the same time stimulating the development of sex.

The Suprarenal Glands.—Adrenin (adrenalin), the hormone contained in extracts of these glands, is derived solely from their medulla. Oliver and Schäfer found that the extract caused marked vasoconstriction, the effect lasting for two or three minutes. The active principle is not destroyed by boiling or by gastric digestion. Adrenin is the only hormone the chemical nature of which is fully understood. It is a secondary amine with this structural formula:—



Recent work has demonstrated that allied chemical bodies have a similar action (Barger and Dale). Langley has shown that the effects produced by adrenin upon any tissue are identical with those following

the excitation of the sympathetic nerve to that tissue. Adrenin can accordingly be utilized to determine whether or no sympathetic nerve terminals exist in any organ. It acts on the receptor substances at the junction of the muscle and nerve terminal.

The styptic value of adrenin cannot be doubted. In the case of pulmonary hæmorrhage, however, it should be remembered that Brodie and Dixon state that the extract has no vasoconstrictor effect on the pulmonary arterioles. This has been contradicted by Plumier, who came to a directly opposite conclusion.

Blun discovered that the subcutaneous injection of the extract produced glycosuria, although the same result did not follow administration by the mouth. The hyperglycæmia following the injections is not due to any vasoconstrictor effect, for Herter has shown that in guinea-pigs the injection of the extract causes marked vasoconstriction but no glycosuria.

Excessive secretion of the suprarenal hormone is believed by some to be the cause of the arteriosclerosis occurring in chronic interstitial nephritis. In many such cases an enlargement of the medulla of the suprarenal glands has been discovered post mortem.

Deficient secretion of the hormone readily explains certain of the symptoms of Addison's disease—for instance, the low blood-pressure and general muscular weakness. There is, however, the difficulty that Addison's disease may occur without lesions in the suprarenal glands, and that lesions in the suprarenals are not always accompanied by Addison's disease. An explanation for this may be found in the theory that chromaffin cells are the producers of adrenin, and that these cells are found in other tissues (sympathetic ganglia and plexuses) as well as in the medulla of the suprarenal glands. Hence, a lesion in any of these tissues might produce Addison's disease, but would only do so if the lesion were not compensated by increased activity in the chromaffin cells in other regions. Abelous and Langlois explain the disease somewhat differently ; they teach that it is due to an auto-intoxication dependent on the inability of the suprarenal glands to remove the poisonous substance or substances, the removal of which the normal gland carries out.

Halle states that the suprarenal glands contain an enzyme which converts tyrosin into adrenin. Further, it has been shown that tyrosin can be converted by oxidation into melanin (Adami). The pigmentation of Addison's disease might thus be due to the tyrosin escaping the action of the adrenal enzyme and being changed into pigment.

Thyroid Gland.—If the thyroid gland be extracted with normal saline, two substances with physiological activities can be separated (Beebe and Rogers): (1) A nucleo-protein containing iodine ; (2) A globulin also containing iodine. Both these substances are present in iodothyrin. Entirely different effects are produced by the injection of these two substances. If the nucleo-protein be injected, there is an increased pulse and blood-pressure, marked nervousness and insomnia, in short, thyroidism. If, on the other hand, the globulin be injected,

the pulse-rate is lowered and there is a fall of blood-pressure. With regard to the effects produced by feeding with these substances, it is worthy of note that large quantities of the globulin are definitely injurious, leading to clay-coloured stools, constipation, headache, pain in right hypochondrium, enlargement of the liver, and pyrexia. In the light of this work, it is clear that there may well be more than one hormone secreted by the thyroid gland.

Excessive formation of the nucleo-protein is believed to be responsible for the symptoms of exophthalmic goitre. Again, it is supposed that there is an antagonism between the globulin and adrenalin ; and some cases of exophthalmic goitre are explained as an attempt to overcome excessive suprarenal secretion (Rogers).

Deficient secretion of one or both of these substances is responsible for cretinism in infant life, and in adult life for myxœdema. It is well known that the latter condition may be produced by complete removal of the thyroid gland. Both these conditions can be much improved by feeding with extracts of the whole gland or with iodothyrin.

Toxic symptoms have been known to follow the administration of large doses of the thyroid gland. The following effects have occurred : Cardiac weakness, albuminuria, glycosuria, increased nitrogenous metabolism, largely augmented respiratory exchange, palpitation of the heart, and diminution of fat. The last effect accounts for the fact that thyroid extract is a constituent of some of the " anti-fat " remedies on the market.

Testis.—The hormone produced by this gland at puberty is responsible for the changes that occur in the male at that period. It is also believed to influence the growth of the bones, for it has been observed that eunuchs and young men with atrophied testicles exhibit a tendency to overgrowth of the long bones, an overgrowth dependent on delayed ossification of the epiphyses. Much has been hoped from the administration of testicular extract in cases of general debility. This extract contains a basic substance (spermin), which has been shown to lead to increased metabolism, and at the same time to a greater capacity for muscular work.

Ovary.—There can be little doubt that a hormone is also formed by the ovary, which brings about the changes of puberty in the female. The constitutional results that follow double ovariotomy are probably due to a deficiency of this hormone. The injection of ovarian extract (öophorin) causes a large increase in metabolism.

Fœtus.—Starling and Lane-Claypon have shown by experiments on virgin rabbits that the fœtus produces a hormone, the injection of which excites the development of the mammary glands.

Corpus Luteum.—A hormone is said to be formed by this body which influences the attachment of the placenta to the uterus.

References.—[1]*Brit. Med. Jour.* Nov. 5, 1910; [2]*Amer. Jour. Med. Sci.* Oct 1910 ; [3]*Jour. Amer. Med. Assoc.* July 24, 1909.

THE DIAGNOSIS OF MORBID TISSUES.

BY

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The question of correct diagnosis of morbid tissues is one of interest and importance to every practitioner, whether the investigation of these tissues is made by himself or by others. Without attempting to present a complete set of instructions which could cover every possible contingency of diagnosis that might arise, the plan decided upon here may meet the wants of a large section of practitioners who carry out operations themselves.

The practice of sending material for pathological investigation to the public laboratories is widespread ; but as the laboratory diagnosis should be intelligently verified or justly criticized, so the laboratory worker is considerably aided by a correct preparation of the tissues which are sent him. If, therefore, the practitioner understands how such tissues are prepared, he will serve the laboratory worker better. It is so easy to prepare a good frozen section that the practitioner who is frequently requiring a microscopic diagnosis of tissues might well find it worth his while to perfect himself in the art or train his assistant to do it. Paraffin sections are greatly to be preferred, but the technique is intricate, and the appliances needed are rather expensive and their preparation requires more time.

A. Selection of the Tissue to be Examined.

The first and most obvious part of the process of obtaining a histological preparation is the actual selection of the fragment of tissue which is to represent the structure of the whole specimen. General rules cannot be laid down ; the operator himself will see which portion is likely to require investigation. In the case of tumours the edge of the growth is to be selected, though portions from the more central parts are very advantageously studied as well. Yellow areas and homogeneous or glassy portions of tissue are so likely to be dead tissue that no information will be gained from their microscopic examination. The fragment should be as thin as possible—$\frac{1}{10}$ to $\frac{1}{8}$ inch or 1 to 3 mm.

B. Preparation of the Tissue.

Having cut out the portion of tissue, it is placed in a *fixative*, i.e., a medium which shall render the various constituents insoluble and accessible by differential stains. Much depends on the choice

of fixative, because certain reagents alone suffice to finally bring to light the minutest details of cell-structure. For all-round purposes 10 per cent *formalin* has no equal; this solution is made by diluting the commercial formalin (40 per cent formaldehyde) four times with tap-water. A few grains of NaCl may be advantageously added to every few ounces of solution. Glandular tissues are best fixed in some mixture containing *bichromate of potash*, and the same medium applies for most delicate tissues, including nervous tissue and soft tumours. The two chief media of this kind are *bichromate-formalin*, which is made up of potassium bichromate $2\frac{1}{4}$ parts, sodium sulphate 1, water 100: formalin (10 parts) is added immediately before use; and *Zenker*, the formula for which is potassium bichromate $2\frac{1}{2}$, sodium sulphate 1, mercury-perchloride 5, glacial acetic acid 5, water 100 parts; add the acetic acid immediately before use. Placed in a small bottle, containing whichever of them is decided upon, the tissue may be despatched to the public laboratory. Osmic acid mixtures are specially good for detailed cytological work, but like the preceding, are troublesome to manipulate, and require frequent changing and subsequently special stains. The formula for Flemming's mixture is osmic acid 2 per cent, aqueous 4 parts; aq. chromic acid 1 per cent, 15 parts; glacial-acetic acid, 1 part. (Hermann's is the same, except that platinum tetrachloride is used in place of chromic acid).

C. Preparation of Microscopic Section of Tissues.

The procedure varies somewhat in each of these cases (the list is, of course, only a selection of the advocated methods).

1. **Formalin Material for Freezing.***— The section is transferred from the formalin to the plate of the microtome, on which a drop of strong solution of gum has been placed. The sections when cut are transferred to a little dish of water, either by means of a brush or the finger-tip (which strikes off the mass of sections on the razor, to be then dipped into the water). A thin section is selected and lifted on to a slide by slipping the latter under it in the water, fixing one corner of the section on to the glass by the aid of a slender glass rod, and lifting out the two together. With some manipulation the section will lie flat upon the slide by the time the latter is wholly withdrawn from the water. If it be desired to fix the section on the slide, the water is drained off, and the section covered with absolute alcohol for a few seconds and carefully blotted. More absolute alcohol is poured on before the tissue has time to dry, and a thin solution of celloidin in absolute alcohol and ether is run over the section. This is drained, allowed to dry a little, and then immersed in water for a few seconds. The film should be invisible. Staining is performed as described below, but, after dehydrating, origanum oil is used as the clearing agent, and the specimen mounted as usual.

* This method is specially recommended for the practitioner.

Staining is done with Harris's hæmatoxylin* (one or two drops) for from a half to two minutes, then dipped into a basin holding about 500 cc. of water, picked up again, rendered blue either with ammonia vapour or saturated lithium carbonate, and tipped into the water again. It is well to turn the section round a little by the aid of the glass rod to ensure thorough washing. It is then picked up again as before, and stained for thirty seconds with picric acid and erythrosin,† and rapidly washed in the same way. The same water will do. Dehydration and mounting is now done in the usual way—add a few drops 95 per cent alcohol (meth. spirit free from paraffin), then a few drops absolute alcohol, then xylol; run off the xylol, blot the section rapidly with fluffless blotting-paper, and rapidly apply a drop of xylol balsam or xylol-dammar and cover with a No. 1 square cover-glass.

Precautions.—(*a*) The freezing must not be too great; the sections are taken just above the frozen layer; grating of the sections and difficult running of the razor mean too much freezing of tissue. Let it stand and freeze again. (*b*) The razor must have a perfect edge: grind it each time on a fine oil-stone. (*c*) The dehydration of the section must be carefully done; milkiness of xylol or white spots in the section mean bad dehydration. (*d*) The xylol must not be allowed to evaporate after the section is blotted. (*e*) The blotting must be done by steady pressure; no movement of the slide or section must occur. (*f*) Never try and fix the tissue on to the glass by drying. (*g*) Never let the section be free of fluid from the time of cutting till the cover is safely on. The best freezing microtome is that made by Sartorius, of Göttingen: perfect sections of any thickness can be cut with it; a cylinder of CO_2 which has to be used with it will last for several hundred sections; the only objection is the size of cylinder which is necessary. The instrument itself is small and very neat. The razors supplied with the machine are easily kept in perfect order.

2. **Bichromate Material.**—(*a*) Fix tissue in Zenker, leave for twenty-four hours, then wash in running water for from twelve to twenty-four hours, and keep in 80 per cent alcohol till used. Subsequently *embed* as described below. Or (*b*) Fix tissue in bichromate formalin; leave three or four days; then wash in running water for twenty-four hours, and keep in 80 per cent alcohol. Subsequently embed as usual. Stains to use with this material—alum hæmatoxylin, phosphotungstic acid hæmatoxylin, eosin, and methylene blue.

The alum hæmatoxylin is made by dissolving 1 gram hæmatoxylin in 100 cc. of saturated aqueous ammonia alum, and adding a crystal

* Hæmatoxylin 1 gram, absolute alcohol 10 cc. When dissolved, pour into a solution of 20 grams potash alum in 200 cc. hot water. Then add 0·5 gram yellow oxide of mercury, and boil; cool rapidly by filtering. Keep in stock-bottle. The solution is filtered into a drop-bottle. Filter before use.

† Saturated alcoholic erythrosin 5 cc., saturated aqueous picric acid 50 cc., water up to 100 cc.; calcium carbonate, a few granules. Filter before use.

of thymol. It is ready to use in ten days. The phosphotungstic hæmatoxylin is made by dissolving $\frac{1}{10}$ gram of hæmatoxylin in 80 cc. of water (warm), and adding 20 cc. of 10 per cent aqueous phosphotungstic acid (Merck); and then 10 cc. of $\frac{1}{4}$ per cent aqueous potassium permanganate. To stain, add Gram's iodine for five minutes to remove the mercury precipitate from the tissues, then 95 per cent alcohol to remove the iodine, now add $\frac{1}{4}$ per cent aqueous oxalic acid for from ten to fifteen minutes, and thoroughly wash; stain with the hæmatoxylin for twenty-four hours; wash with 95 per cent alcohol for a couple of minutes, dehydrate, and mount. The eosin and methylene-blue staining is performed by first staining for ten minutes, with 10 per cent aqueous eosin; then washing, and then for ten minutes staining with 1–4 methylene blue (methylene blue 1 per cent, potassium carbonate 1 per cent in water); differentiate with alcohol containing 1 per cent colophonium resin, and mount in colophonium xylol.

3. **Osmic Material.**—Fix for from one to three days; running water twenty-four hours; keep in 80 per cent alcohol.

Stains to use with this—*Babes' safranin* (2 per cent aniline water, saturated with safranin and soluble in water by keeping the flask at 60° to 80°, then filter). The section is stained two minutes, washed, and dehydrated.

Aniline gentian violet (16 cc. saturated alcohol gentian violet and 84 cc. of aniline water), or carbolfuchsin may be used. These are familiar in staining bacteria generally, and tubercle bacilli.

4. **Bone.**—Tissues containing bone are decalcified with 10 per cent trichloracetic acid after formalin fixation for a prolonged time. The tissues are to be cut with the freezing microtome and not embedded in paraffin, because these sections can be readily cut with the machine referred to, with the advantage of no shrinkage of the cellular elements from the bony trabeculæ.

The stain to use with this is 4 cc. of 2 per cent iron alum, to which 3 drops saturated alcoholic hæmatoxylin is added; wait till the mixture is purple; wash in water; if necessary, decolorize a little in 1 per cent acid alcohol, then stain for a few moments with Van Gieson ($1\frac{1}{4}$ gram acid fuchsin, 150 cc. saturated aqueous picric acid; add 10 cc. saturated aqueous picric acid to every 1 cc. of above). Stain for ten seconds, wash; dehydrate and mount.

5. **Embedding in Paraffin.**—Requisites: (*a*) A small double-jacketed copper oven such as is listed in chemical price lists ("embedding ovens" are not recommended, merely because they are priced at an unnecessarily high figure). (*b*) Gas burner—a regulator is unnecessary as a rule; a tiny peep-light will often keep an oven at 45° to 50° C. without difficulty. (*c*) Paraffin melting at 43° C. and at 50° C. (*d*) Small Stender dishes to receive the 43° paraffin, and (*e*) A little enamelled tin jug for the 50° C. paraffin. (*f*) A pair of old forceps. (*g*) Slips of tin of L-shape to receive the 50° paraffin in which the tissue is finally placed. (*h*) Reagents: pure (paraffin-free)

methylated spirit, absolute alcohol, xylol ; or acetone in place of the last two. (*i*) Microtome, e.g., Cambridge rocker or Minot's.

Résumé of Embedding.—Have the tissue in a wide bottle with a little cotton-wool at bottom ; in twenty-four hours transfer from formalin to spirit, in four hours to absolute, in four hours to another change of absolute, in four hours to xylol, where it stays till translucent ; then to paraffin oven for two hours (two changes) and embed. When set, the section is trimmed and mounted on the microtome, and sections are cut. They are affixed to a slide by floating first on lukewarm water (about 40° C.) till flat, holding the clean slide (coated with a thin egg-albumen solution) under the sections, and drawing both out together from the bowl of water. The slides are left on the top of the oven to set. The paraffin is subsequently dissolved out with xylol, the xylol with alcohol, and the alcohol with water. Staining is then proceeded with.

Requisites for Staining.—Drop bottles to receive the stains quoted, also for 95 per cent alcohol, for absolute alcohol, and for xylol. No. 1 cover-glasses $\frac{7}{8}$ inch square, 3 by 1 in. slides (best quality). This glassware may be cleaned with potassium bichromate 2 parts, sulphuric acid 3 parts, water 25 parts, for from $\frac{1}{2}$ to 1 hour, then rinsed in water and kept in strong spirit. Fluffless ("histological") blotting-paper. Bottle for dammar-xylol, balsam-xylol, or colophonium-xylol.

The staining and mounting is carried out as indicated above.

Diagnosis of Morbid Tissues by the Practitioner.—Whereas the student is expected to recognize most common morbid tissues, the practitioner is concerned with relatively few, and these are cases in which many aberrant types of lesion may be met with. Thus tuberculous and syphilitic lesions, distinction between epitheliomatous and simple chronic ulcers, carcinomas and adenomas, sarcomas and granulation-tissue, are frequent subjects of importance. Attention may be drawn to the remarks on these points on pages 109, 110, 119, and to the coloured plates. The description of possible lesions has been formed on an unusual plan, which has, however, been found useful, and one which enables a more extensive survey of the sources of perplexity than would be possible in a straight-on account of successive lesions. The *principles* require to be studied, the *practice* will then be easy.

D. Procedure for arriving at a Diagnosis with the Microscope.

The first question which has to be decided in each case is whether the tissue is normal or not. This is fairly obvious, but a point frequently forgotten, because the tendency is to conclude that a tissue removed at operation is necessarily diseased. Having come to the conclusion that the condition is certainly pathological, one should endeavour to decide between

1. *Degenerations*
2. *Inflammations*
   - (*a*). Acute
   - (*b*). Chronic
     - i. Simple
     - ii. Tuberculous
     - iii. Syphilitic
     - iv. Other granulomas.
3. *New growths*
   - Innocent
   - Malignant.

Atrophied and hypertrophied organs are difficult to distinguish from normal ones if uncomplicated by other disease, but a decision one way or another does not become of practical importance.

1. **Degenerations.** — The commonest lesion to be classified under this group is *cloudy swelling*, and is best seen in the kidney and liver. The tissue cells are seen to be swollen, to have a fine granular structure, an ill-defined outline, and a pale nucleus which shows little structure. With alkaline methylene blue one may find metachromatism of the nucleus—that is, a purple staining instead of blue. *Fatty change* is identified in paraffin sections by the appearance of round clear spaces within the tissue cells. This is best identified in the liver, and is usually indicative of infiltration, the nuclei of the tissue cells being preserved and mostly pushed on one side. In other organs special preparations are needed to demonstrate fatty change, because the granules are too small to be identified with certainty when unstained. Thus, a frozen section should be prepared and stained for one or two hours with saturated alcoholic Sudan III, the section being then covered with a drop of Farrant medium (without washing) and so mounted. The fat droplets then appear as yellow or orange globules. For paraffin sections, the tissue should be placed in the dark in 1 per cent osmic acid for twenty-four hours before embedding. Counterstaining is unnecessary, though methods for making show preparations of that kind may be found in text-books of practical histology.

Other degenerations cause no difficulty of diagnosis as a rule, and in examination-specimens are readily identified by the stains used to demonstrate them in any given case. A faint homogeneous "glassy" appearance of a cell or, e.g., wall of capillary, is indicative of hyaline degeneration, and when present is a valuable indication of the nature of a morbid process in tissues of complicated morbid histological structure.

2. **Inflammations.**—

(*a*) Acute Inflammations are characterized by the intense congestion of the blood-vessels and the abundant exudation of "small round cells," with pushing asunder of the normal tissue elements by clear material (the exuded plasma). Here it is possible to fit the pathological elements present into the architectural plan of the normal tissue in question in the given case. For instance, in the wall of the appendix we have a certain just proportion between lymphocytes (so-called histogenic) and the fibre cells of the connective

tissue; if this is obviously increased in favour of the mononuclear cells (in addition to vascular engorgement), we should call the case one of acute appendicitis. The ranges between which cell-infiltration is still normal can only be correctly identified by practice and experience. When due to local organismal growth, the clusters of micrococci may be readily distinguished. *Miliary abscesses* are distinguished by the preponderance in the cell exudate of polymorphonuclear leucocytes which show the characteristic horseshoe nucleus, or may appear as groups of three deeply-blue-staining spots. The cellular elements which go to make up an acute inflammatory exudate are polymorphonuclear leucocytes, lymphocytes of various kinds, eosinophile cells (few), young fibroblasts, cast-off epithelial or endothelial cells, fatty cells, and phagocytes. These will be referred to in more detail later. The variation in type of cell-exudate according to the micro-organism present is a refinement which need not here be gone into.

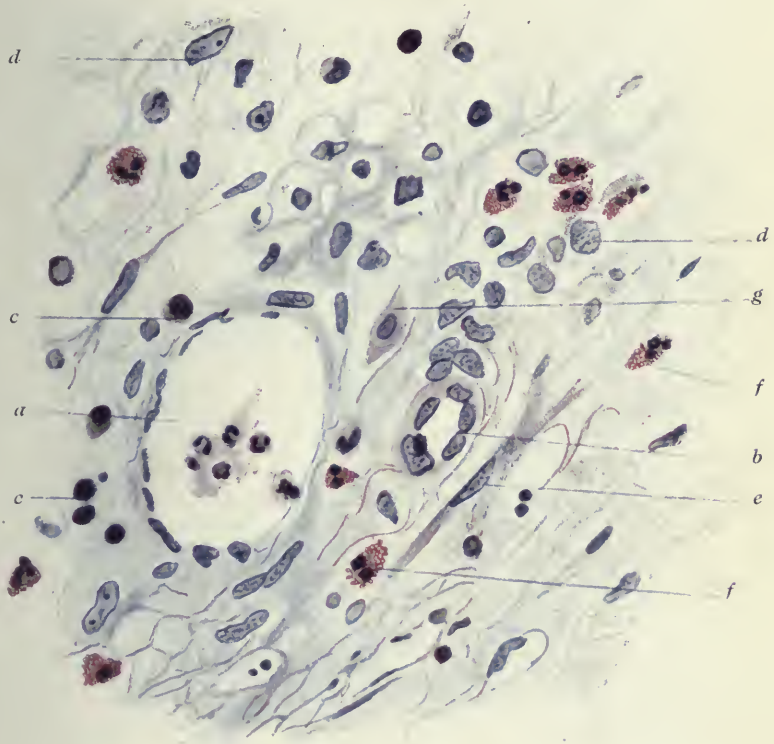
(*b*). Chronic Inflammations (*Plates I* and *II*).—It is tissues belonging to this class that form the real stumbling-block to correct tissue diagnosis. Experience greatly helps in perfecting this art, but some general lines can be laid down. It is here again that detailed cell-structure becomes all-important in deciding the nature of the various cells composing the exudation. These inflammations may be grouped into four.

(i.) *Simple*.—This is only to be diagnosed if there is no evidence of the other three. Granulation tissue in a healthy wound affords the best example of this class of inflammation; but the diagnosis of the cell elements is best deferred to Section 3, where all kinds of cell-variations are discussed. The loose arrangement of mononuclear leucocytes (*Plate II*), histogenic lymphocytes (*Plate I*, *c*), young fibroblasts (*Plate I*, *e*, *g*), polyblasts (*Plate I*, *d*), foreign-body-giant-cells (*Plate II*, *d*), plasma cells (*Plate II*, *e*), mast cells, etc., in a very loose reticulum, with the occurrence of numerous capillaries with very delicate walls, is the basis of a diagnosis of granulation tissue.

(ii.) *Tuberculous Inflammations*.—Here we have three main types from the histological point of view. The first is the common, well-known, miliary form, where definite giant-cell systems are met with (*Plate III*). A good giant-cell system should show a central giant cell with peripheral nuclei and a pseudopodia-like series of processes. The immediate surround of the cell should be a clear space crossed by these processes, and then should come a ring of epithelioid cells (*Plate III*, *b*), intermingled with "small round cells" (*d*), followed by a zone of dense, small, round-celled infiltration (*e*), intermingled with spindle-shaped fibroblasts (*f*). The exact type is best seen in tuberculous synovial membranes and in tuberculous testes. The endless modifications shown by these cell-systems confuse the student, but he should put much stress on the type of the giant cell. Of course, standard preparations would contain stained tubercle bacilli to clinch the matter.

PLATE 1.

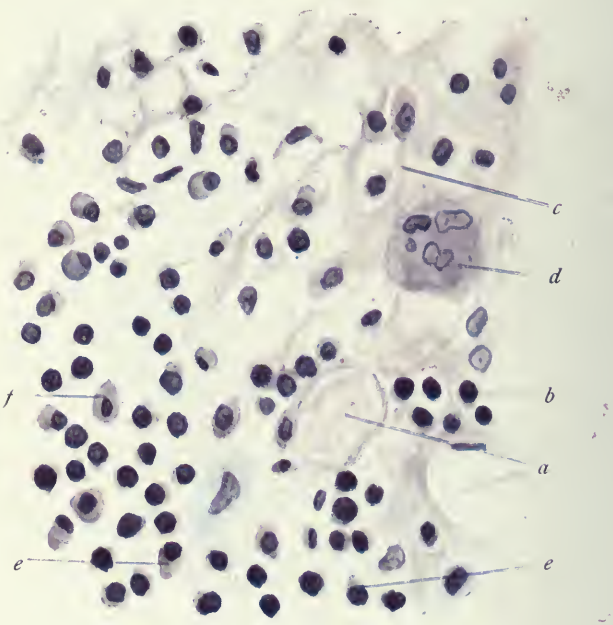
DIAGNOSIS OF MORBID TISSUES (GRÜNER).



From a case of chronic salpingitis, showing the cells in a chronic inflammatory exudate, with commencing fibrous-tissue formation and marked eosinophilia: (*a*), a large capillary containing a few polynuclear leucocytes; (*b*), a young capillary; (*c*), histogenic lymphocytes, which are close to the walls of (*a*); (*d*), fixed connective-tissue cells; polyblasts; some are dividing; (*e*), young fibroblast; (*f*), eosinophile cells; (*g*), older fibroblast. Note the fibrillar meshwork underlying the tissue. Formalin fixation. Stained with hæmatoxylin and eosin. (× 600).

PLATE II.

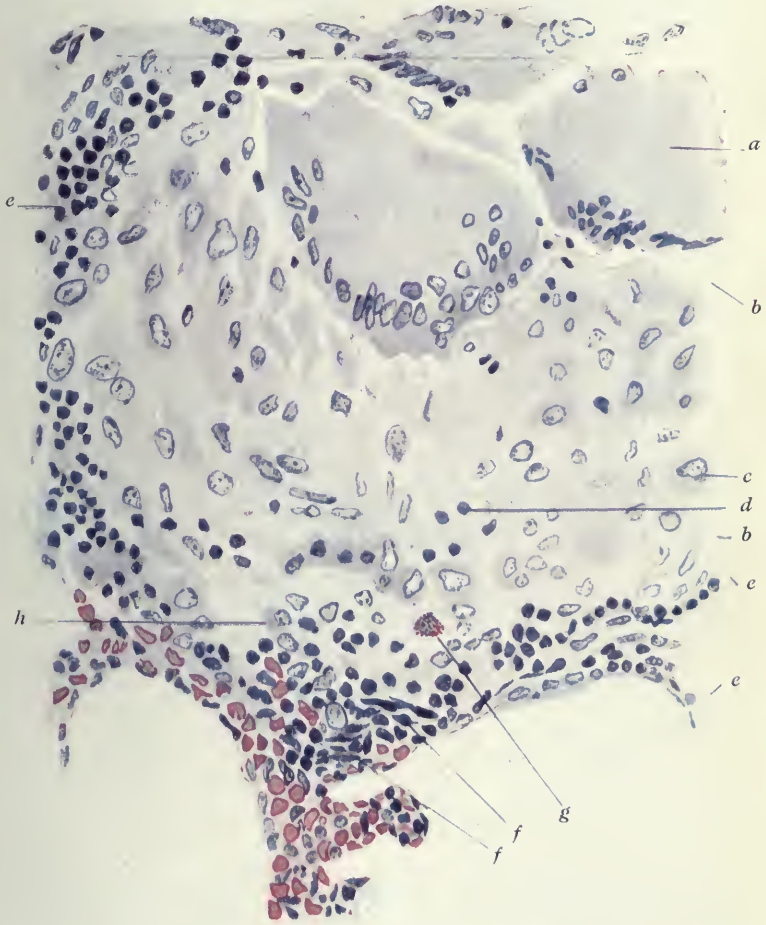
DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).



Section showing the appearance of granulation tissue of non-specific origin. The cells are widely separated by œdema, there are often fibroblasts, and no deposition of fixed connective tissue. A few vascular spaces can be seen. Stained with hæmatoxylin and eosin. (*a*), vascular clefts; (*b*), histogenic lymphocytes; (*c*), fibrin threads; (*d*), foreign-body giant cell; (*e*), plasma cells; (*f*), connective-tissue cells. Fixed in formalin. (× 600.)

PLATE III.

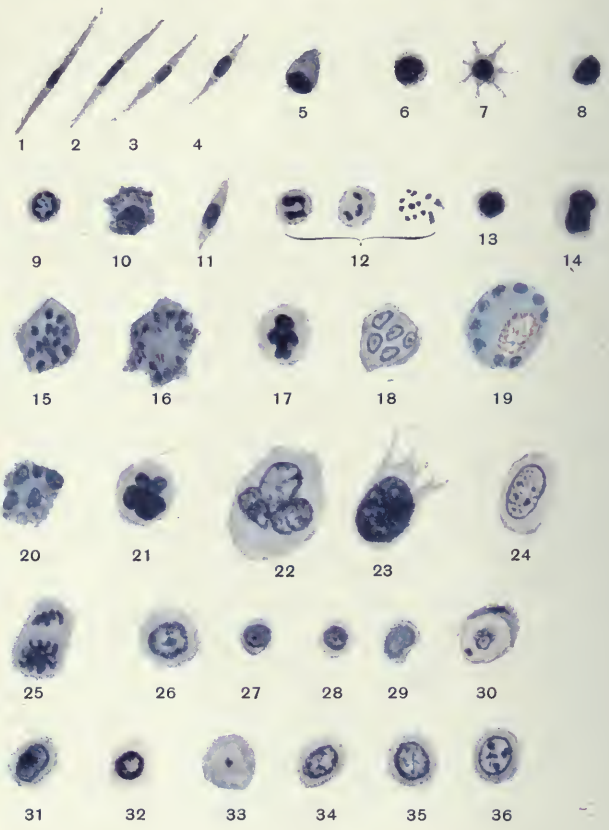
DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).



Portion of a miliary tubercle, as seen with oil-immersion lens (Oc. 6). The specimen is derived from a lung in a case of miliary tuberculosis, the tissue having been fixed in Zenker and stained with methylene blue and eosin. The various cells met with in chronic inflammatory exudates are seen, besides the characteristic giant cells (*a*). Around them is a zone of epithelioid cells (*b*), with large amblychromatic nucleus, pale centre, and (usually) peripheral granulation. The outlines of the bodies of these cells are ill-defined. Some of these cells show metachromatic nucleoli (*c*). Among the cells are a few infiltrating lymphocytes (*d*). Beyond the epithelioid layer is a narrow zone of lymphocytes, (*e*), amongst which are a few spindle-shaped fibroblasts, (*f*). (*g*) is an eosinophile cell, (*h*) a plasma cell. Note the closely-packed red cells in the lower part of the drawing, constituting a portion of the fringe of congestion enclosing the whole nodule. A portion of the wall separating the adjoining alveoli forms the lowest part of the drawing.

PLATE IV.

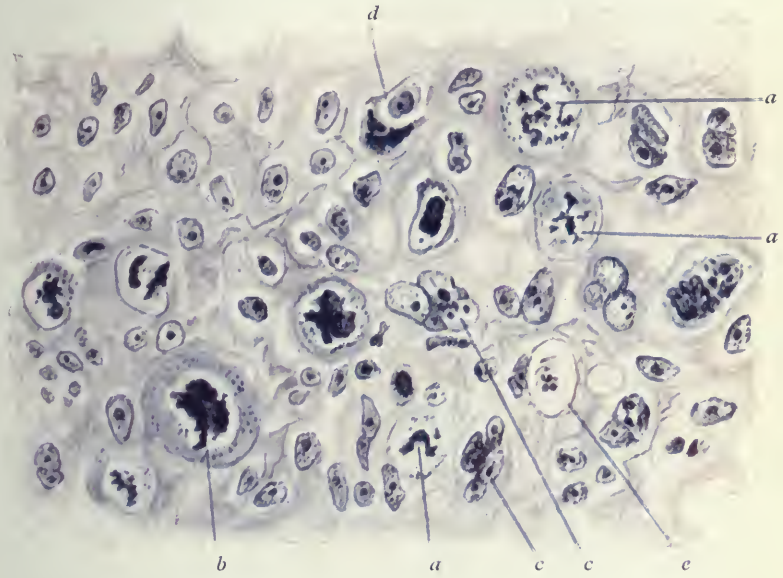
DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).



1, Cell from fibroma; 2, from myoma; 3, from neurofibroma; 4, from spindle-celled sarcoma; 5, plasma cell; 6, round-celled sarcoma; 7, gliosarcoma; or myxosarcoma, if processes were longer; 8, lymphosarcoma; 9, tissue lymphocyte; 10, clasmatocyte—the polyblast looks like this, but has long amœboid processes, and is only seen as such in special preparations; 11, fibroblast; 12, two cells, and a group of fragments—degenerate leucocytes from focus of suppuration; 13, tissue lymphocyte—commoner form than 9; 14, cell from mixed-celled sarcoma; 15, giant-cell from myeloid sarcoma; 16, from tubercle, shows bacilli; 17, from lymphosarcoma; 18, from syphilitic lesion; 19, from leprosy nodule, showing bacilli in the vacuole; 20, from actinomycotic nodule; 21, from polymorphous-celled sarcoma; 22, from osteosarcoma; 23, large cell from osteosarcoma; 24, endothelial cell from lymphadenoma gland; 25, cancer cell with atypical mitosis; 26, cell from carcinoma of branchial cleft origin; 27, spheroidal-celled cancer of breast; 28, ditto, scirrhus type; 29, from spheroidal-celled cancer of liver; 30, cancer cell with parasite (pink); 31, mixed-celled sarcoma; 32, normal cell from renal tubule; 33, swollen (dying) carcinoma cell; 34—36, squamous carcinoma cells. All drawn to scale. (× 500.)

PLATE V.

DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).



Mitoses in squamous-celled carcinoma. From an atypical form growing in the urethra. A preparation fixed in formalin and stained with Heidenhain's iron hæmatoxylin. The hyaline cytoplasm which is partly liquefying is characteristic. The black-staining nuclei include many actively mitosing forms (irregular kinetic figures) of gigantic size. Of all the cells present, hardly any two are alike. (*a*), atypical mitoses; (*b*), formation of massive clumps of chromatin; (*c*), giant cells; (*d*), cell with inclusion (note nucleus distorted into semilunar shape); (*e*), vacuolated cell with inclusion containing metachromatic bodies. (× 600.)

DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).

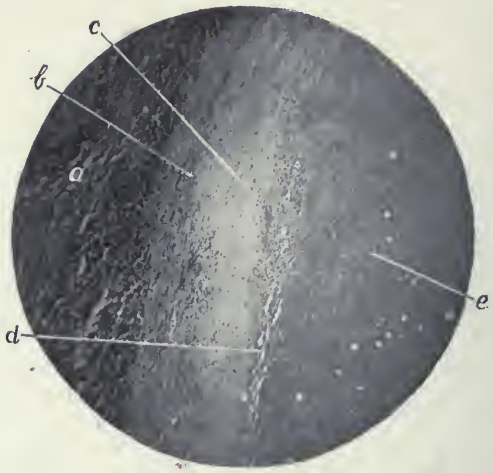


Fig. A.—From edge of a gumma of the liver, showing (*a*), compress liver tissue; (*b*), narrow zone of round-celled infiltration; (*c*), broad zone of white fibrous tissue; (*d*), fragments of hyaline line; (*e*), homogenous caseous centre. Note the undue fibrosis, with scanty cell-infiltration, and the absence of giant-cell systems. (× 80.)

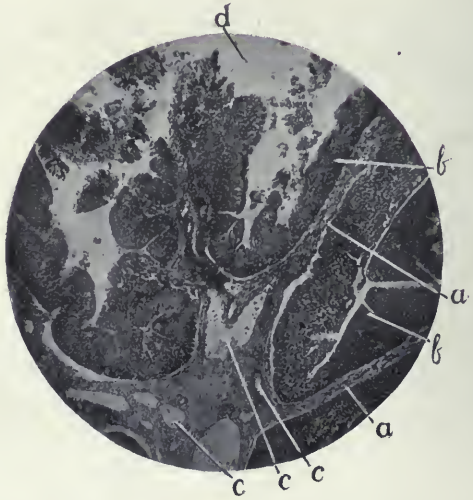


Fig. B.—From a villous tumour of the bladder (papilloma), showing portions of papillary processes, (*a*), covered by stratified squamous epithelium, (*b*). Some dilated capillaries, (*c*), can be seen in the stroma. Bladder cavity, (*d*). This tissue was uniform throughout, and there was no tendency of the tumour cells to penetrate the bladder wall. (× 100.)

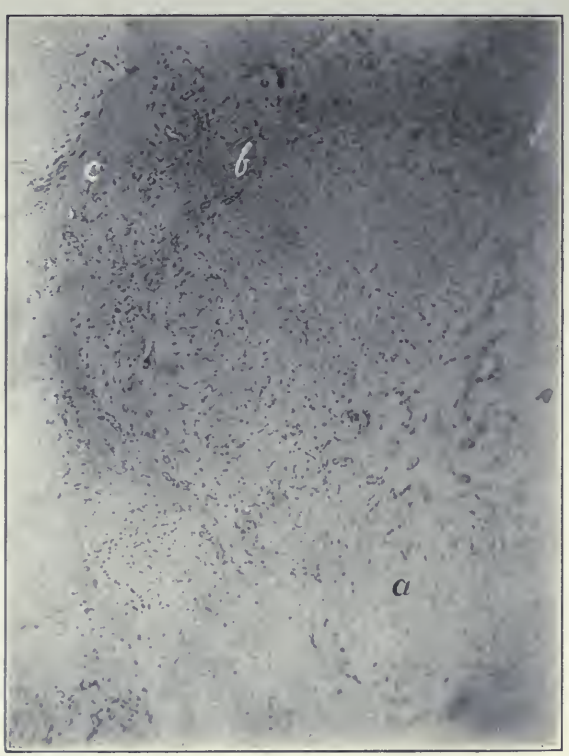


Fig. C.—A portion of an endothelioma of the parotid. The black dots, forming wisp-like strands here and there, are the tumour cells, while the intermediate tissue is tinted to a varying degree according as it is myxomatous, (*a*), or more fibrous, (*b*). At (*c*) a definite fibrous band is seen. (×60.)

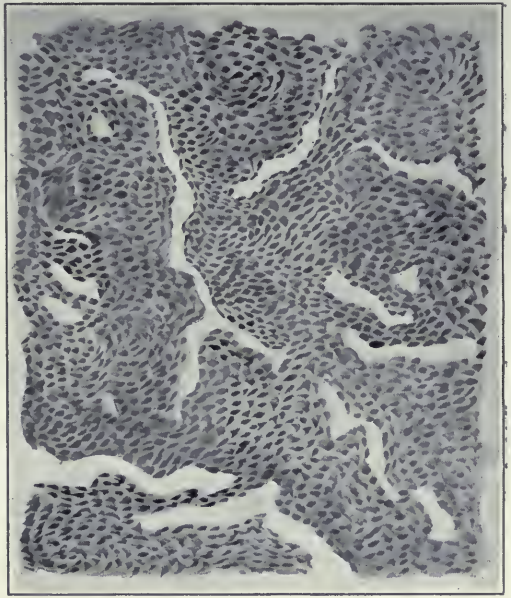


Fig. D.—A portion of an endothelioma of the parotid second type), showing narrow clefts (vascular spaces) lined by and separated by short, thick, spindle-shaped cells.

Fig. E.—Portion of a small round-celled sarcoma, showing dense masses of small round cells, devoid of any definite arrangement, and separated by a few bands of connective tissue. The numerous clefts are chiefly due to breaking up in preparation, but some are vascular. (× 80.)

Fig. F.—A portion of a scirrhus cancer, showing typical tongue-like (*a*, *a*) and wisp-like (*b*, *b*) groups of cancer cells, and intervening fibrous stroma of white fibrous tissue, (*c*). (× 60.)

PLATE IX.

DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).

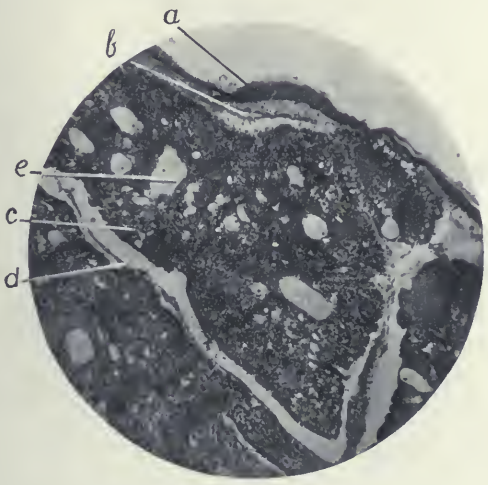


Fig. G.—A portion of a rodent ulcer, showing: (*a*), surface epidermis (intact); (*b*), dermis; (*c*), tumour tissue composed of small polygonal cells with deeply-staining nuclei of rounded shape; (*d*), connective tissue with lymphatic clefts separating masses of cells of growth from each other; (*e*), small lymphatic spaces permeating the growth. (× 100.)

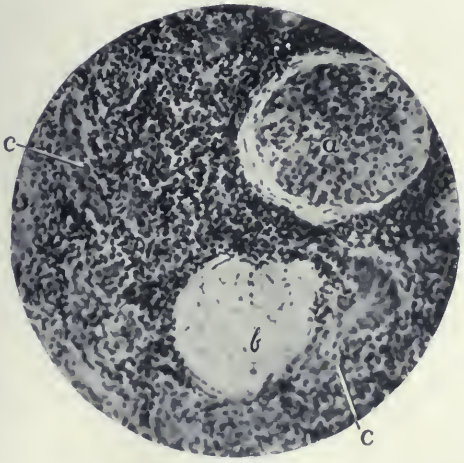


Fig. H.—Portion of kidney tissue, showing the glomeruli, one preserving normal appearance (*a*), the other in a state of hyaline degeneration (*b*). From a case of suppurative nephritis. Some indications of tubules are seen at (*c*). The remainder of the picture is occupied by a rather dense infiltration with small round cells, whose nuclei stain with varying intensity. A few polynuclears (horse-shoe nuclei) can be seen amongst them. (× 400).

DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).

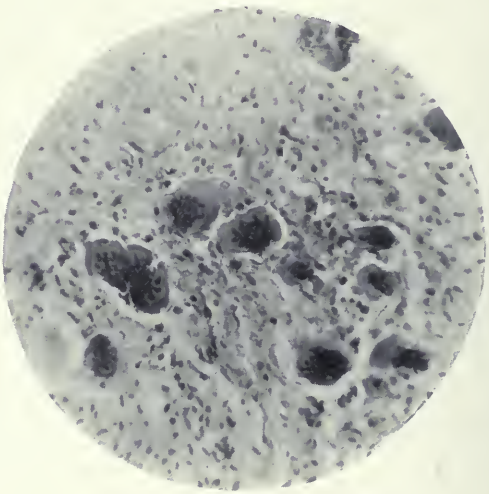


Fig. J.—From a myeloid sarcoma, showing the typical giant cells lying in a stroma formed of spindle-shaped and round cells. (× 400.)

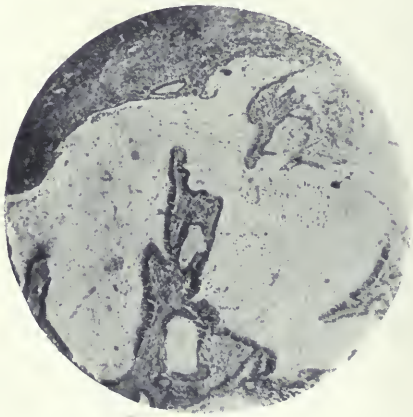
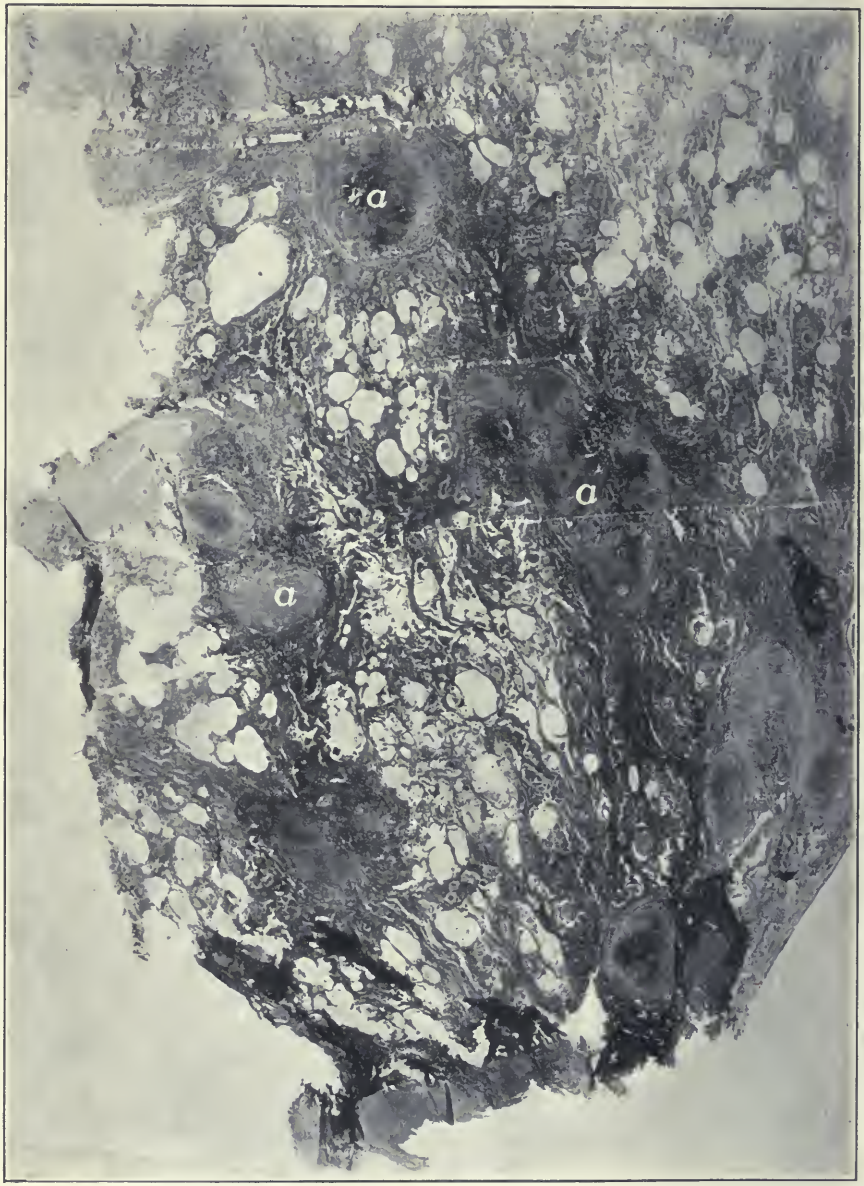


Fig. K.—From a columnar carcinoma of the rectum undergoing colloid degeneration. Note the processes covered by slender columnar cells and the hyaline material occupying the acinous spaces. (× 100.)

PLATE XI.

DIAGNOSIS OF MORBID TISSUES—*continued* (GRÜNER).

A portion of a hypernephroma, showing (*a*) dilated spaces containing hyaline material, lined by cubical cells of characteristic appearance. The intermediate tissue (*b*) is occupied by irregularly-arranged polygonal cells of similar appearance; (*c*) Groups of red-blood cells within an acinus, i.e., a blood-containing acinus; (*d*) Porous tissue at edge of tumour; (*e*) Patches of inflammatory cell infiltration; (*f*) Vascular clefts in capsule. (× 40.)



A portion of lung, showing chalicosis (stonemason's lung). The condition is one of chronic interstitial pneumonia (increase of fibrous tissue between the air-cells), with focal areas, (*a*, *a*, *a*), in which stone (central black spots) is deposited and enclosed by circular laminations of fibrous tissue. The fibrous tissue elsewhere is seen to be infiltrated with small round cells. Some of the air-cells are dilated (emphysema), others much diminished in size. (× 80.)

The second type is that in which there is caseation. Generally, as in the case of the tuberculous glands of the neck—so frequently sent for microscopic examination—there are several large pink areas quite devoid of structure, with a thin zone of inflammatory cells mapping them off from the normal tissue. Usually one or two distorted giant cells can be made out, but absence of such does not exclude tubercle. The only mistake to be made, then, is diagnosis from a gumma. Look for evidences of calcification in the caseous mass (stain blue with hæmatoxylin). See below also.

The third type, fibroid tubercle, is the most troublesome of all. One gets here a dense infiltration with spindle-shaped cells (fibroblasts) (*Plate I, e, g*). They will be intermingled with many other kinds of inflammatory cells. These will be referred to in discussing tumour-diagnosis. Clinical notes alone can decide with certainty on this type of tubercle—duration of illness, age of patient, sex, physique, other lesions, etc. It is quite likely that the statements of non-existence of Hodgkin's disease are due to incorrect interpretation of this form of tubercle.

(iii.) *Syphilitic Lesions.*—The secondary syphilide and chancres both exhibit certain distinctive features. The diagnosis of chancre is fairly easy if aware of its possibility ; that is to say, if one is told it is a suspicious penile or labial ulcer. It would not be possible to diagnose a chancre from just a fragment of ulcer without any particulars : apropos of which it may be pointed out that in 90 per cent of tissues no histological diagnosis can be attempted unless a few clinical details are supplied.

It is useless to imagine that routine pathological diagnosis of a syphilitic lesion will rest on finding spirochætes. A specially directed search, and specially directed fixation of tissue with suitable staining, might lead to their discovery after a long hunt, but for *practical* purposes other simple evidence is much more satisfactory. The most important feature about a chronic syphilitic lesion is the great preponderance of plasma-cells (*Plate III, h, Plate IV*, 5).* It is true that these are best and beautifully seen in Pappenheim preparations, but they can be easily observed by the routine staining method. The plasma cell is triangular in shape, has a " dirty " protoplasm, and its oval or round nucleus is tucked away in one corner of the triangle, causing the cytoplasm to be very conspicuous. The latter is decidedly granular. A clear spot is alone noticed with special staining ; it is close to the nucleus. The presence of these cells is not diagnostic of syphilis, but they are so abundant in syphilitic lesions that one should immediately inquire into the possibility of such a diagnosis. The only other condition in which they are conspicuous is tubercle, a fact which is very unfortunate for the diagnostician. Really, the

* Note that these cells are not all identifiable as such. They are taken as types, and the method of diagnosis detailed in the text must be adopted. The drawings are intended merely to help the descriptions.

best procedure in cases of doubt would be to proceed at once to do a Wassermann reaction with the patient's serum.

Another peculiarity about syphilitic cell-infiltration is an occasional abundance of eosinophile cells, which will come out well in the standard preparation. However, no diagnostic importance can be attached to their presence, as they are frequent in any chronic inflammation. In the case of gummata, we have an appearance very like caseous tubercle, without the giant cells (see also below, under "Giant Cells"). The chief points about differential diagnosis are, in the case of gumma: small zone of inflammatory infiltration, preponderance of spindle-shaped fibroblasts in it, appearance of only a few calcareous granules scattered anywhere through the caseous mass, occurrence of a translucent line internal to the inflammatory zone. These are all negative in the case of solitary tubercles. A search for syphilitic endarteritis in the small arterioles, and the detailed characters of the scattered foci of inflammatory cell-infiltration, are minutiæ not possible in ordinary practice.

(iv.) *Other Granulomas.*—Leprosy nodules do not need reference beyond mentioning that the giant cell is characteristic, the bacilli being arranged at the edge of a large vacuole (*Plate IV*, 19).

Actinomycotic nodules are identified by the characteristic ray-like arrangement of the fungus lying in the same relation to a small-celled infiltration as is occupied by the giant cell of a tuberculous nodule. Granulomas due to other organisms vary in character: some are like nodules of ordinary granulation tissue, enclosed by various amounts of chronic sclerosing inflammation; others are composed almost entirely of epithelioid cells, which may be arranged in whorls or quite irregularly, and include in these cases numbers of giant cells (*Plate IV*, 20) very similar to those of tubercles, and containing foreign bodies of all kinds. Frequently it is in them that the causative agent will be found.

3. **New Growths.**—The decision as to whether a growth is innocent or malignant depends on a number of factors. Not only must the surroundings of tumour cells be considered, with the degree of vascularity, the characters of the walls of the vessels, and the amount of inflammatory reaction; but also the actual minute characters of individual cells. There is considerable variance of opinion as to the value of studying nuclear characters of cells from the point of view of practical diagnosis, but there can be no question that full study of cell structure is needed, and to the student it is a great help to know what form of tumour or tissue may contain any given kind of cells which he sees. The relations between the edge of the tumour and the surrounding tissue are very important, and are the sole basis of decision between, say, a papilloma of the skin or bladder and an epithelioma of either. But it is excellent practice to examine tissues from the middle of living parts of tumour and observe the various cell types met with in different cases. For this purpose an oil-immersion lens should be employed, and the coverglasses used in mounting must be the thinnest

possible. In the absence of an oil-immersion lens, the $\frac{1}{6}$ objective and a specially high eye-piece will suffice for ordinary purposes. It will be convenient to take a classification of tumour cells according to their shape, and discuss the various kinds of tumours for which the particular shape of cell is characteristic. In studying the cells, note the shape of the nucleus, the intensity of its staining, the abundance of cytoplasm relative to the nucleus, the structure of the cytoplasm, the presence of nucleoli, the position of the nucleoli within the nucleus, and the pattern of the chromatin network; also note the amount of interstitial substance between the cells.

The cells may be grouped into: (i) *spindle-shaped*, (ii) *round*, (iii) *multinucleate*, (iv) *carcinoma*, (v) *columnar*, (vi) *other glandular cells*.

i.—*Spindle-shaped Cells* may belong to a fibroma, a neurofibroma, a myoma, a sarcoma, a fibrosarcoma, and sclerosing inflammatory tissue. The nucleus is rod-like in myoma (*Plate IV*, 2), large, surrounded by a large amount of cytoplasm, and shows an exceedingly fine network of chromatin, without any evidence of nucleolus. It is elongated, slender, and faintly staining (amblychromatic) in fibroma cells (*Plate IV*, 1), it is small compared with the amount of cytoplasm, the cells are separated by a conspicuous amount of hyaline interstitial substance, and blood-vessels are scanty. It is shorter, but otherwise much like the preceding in neurofibromata (*Plate IV*, 3), where we also have long strands of spindle cells passing through tissue whose cells are cut across transversely, and look like the cross-sections of obliquely cut normal nerve fibres. It is much shorter in sarcoma cells (*Plate IV*, 4), whose nuclei are intensely staining (trachychromatic), and present a typical network. The cytoplasm can be seen to tail off into numerous fine branchings in suitably obtained sections (phosphotungstic hæmatoxylin). In the case of sclerosing inflammatory tissue, the spindle cells are intermingled with certain other typical cells (to be referred to later). As regards the diagnosis of fibrosarcoma, there is more difficulty, and it is probably impossible to be certain of it. In any case of doubt, if the growth has not existed very long, or came from the breast or thigh, one may be morally certain that it will prove clinically a malignant tumour. The prognosis is consequently to be guarded.

ii.—*Round Cells.*—These may belong to round-celled sarcomas of large or small-celled variety, to gliosarcomas, to lymphosarcoma, and to subacute or suppurative inflammation, or to granulation tissue. The number of tissues in which round cells preponderate or constitute the sole feature, is small, so that one often meets with tissues which have to be diagnosed after considering several general points, and not according to cell characters. A warning has to be given that cross-cut spindle cells appear as round cells, that under the present heading only relatively small-sized cells are considered (the larger round cells coming under the heading of carcinoma), and that round cells and spindle cells preponderate in the case of myeloid sarcoma. The latter kind of tissue, however, is easily identified by the presence of giant

cells, so that it is wise to search carefully through a tissue obviously neoplastic in nature, which is composed of spindle cells and round cells, to search specially for giant cells, and so avoid missing a myeloid sarcoma.

Now as to the character of "round cells." Sarcoma cells (*Plate IV*, and *Plate VIII*, *Fig. E*) are provided with a mere film of cytoplasm around the nucleus, so that in some sections it is quite impossible to make out the presence of anything but nuclei. The nucleus of such a cell stains very deeply with hæmatoxylin, and unless care is taken will come out quite black. The whole cell is about the size of a lymphocyte of normal blood or of lymph-glands. That is why it is so difficult, if not impossible, to identify a sarcoma cell as an individual. The marks within the nucleus are found to be regularly distributed throughout it, and they are devoid of other diagnostic aid. However, the regularity of distribution of chromatic points should be noted (*Plate VIII*, *Fig. E*). In some cases, especially where the texture of the growth is looser, the shape of the cells is found to be polygonal and not round, while the corners of the cell-body pass off into very slender processes of great length. These are the only minute characters that can be relied on. The certain diagnosis of sarcoma must always rest on these points: (*a*) the close aggregation of large numbers of exactly similar cells, (*b*) the presence of a number of blood-spaces without definite lining wall, (*c*) the invasion of the surrounding tissues by similar cells, (*d*) the naked-eye appearance of the growth. Round cells of large round-celled sarcoma are almost exactly like those of spheroidal-celled carcinoma (see below). The round cells of gliosarcoma are indistinguishable from those of ordinary sarcoma when the latter possesses a loose structure (e.g., myxosarcoma). One would be guided by a knowledge of the source of the tissue, knowing that round-celled sarcomas in the central nervous system are usually gliosarcomatous in nature. The minutest points of difference are beyond the scope of the present account. In the same way, lympho-sarcoma is difficult to identify except when arising in the glands of the neck, but the looseness of the structure and the ease with which a reticular network (formed by the interlacing processes of the sarcoma cells) is seen, are points to bear in mind. Melanotic sarcoma cells will be referred to later. These include the cells which circulate in the blood, those which are derived from lymph-gland stroma, and cells produced by proliferation of connective-tissue cells, besides connective-tissue corpuscles and plasma cells. The identification of such an inflammatory tissue is best carried out by observing the heterogeneous nature of the cells. Instead of all being referable to one or two types, it is striking to see the varieties of cells which occur together in any one field, and the concentration of such polymorphous types round capillaries, with, in some cases, great thickening of the walls of the small arteries. The nuclear characters are as various as the shape of their cell bodies. The lymphocytes have deeply stain-

ing (trachychromatic) nuclei ; the polynuclears are readily identified by their horse-shoe-shaped nuclei (*Plate IV*, 12) ; the plasma cells by the characters already described ; the connective tissue cells resemble lymphocytes in a section, only their nuclei stain less intensely and show more massive chromatic points within them ; the fibroblasts have a delicate spindle-shaped nucleus, and increase in numbers according to the chronicity of the lesion. Clasmatocytes also occur. The occurrence of all these types in granulation tissue (*see Plate II*) allows a correct diagnosis to be made, in spite of the close similarity between granulation tissue, round-celled- and lympho-sarcomas, or even other sarcomas. The use of an oil-immersion lens and close study of the cell body and nucleus of individual cells, are perhaps essential to the diagnosis of cases of this kind. The difficulties attached to this class of case can perhaps only be overcome by practice.

The term polyblast (*Plate IV*, 10) has been made use of several times, and may be described as a cell characteristic of that met with in subacute and chronic inflammations. It is the parent cell of any of the cells characteristic of these inflammations, such as epithelioid cells, plasma cells, clasmatocytes, and mast cells. It is phagocytic in function, and may, by coalescence with others of the same kind, give rise to large multinucleate cells. The latter constitute what is popularly called a foreign-body giant cell and, as may be imagined, vary considerably in detailed character, the nuclei being sometimes uniformly distributed and sometimes peripheral. Probably, strictly speaking, all giant cells are foreign-body giant cells. The polyblast has a square outline with a tendency to amœboid form, a granular cytoplasm, and a relatively large nucleus, with abundant chromatin. The exact shape of the cell can only be seen to advantage in special preparations. According to Ziegler and Maximow, the polyblast is a descendant of the hæmogenic lymphocyte, that is to say, the lymphocyte derived from blood-forming organs. The plasma cell has already been referred to ; the clasmatocyte has a spindle or stellate shape, the ends of the star being a little thickened and the cytoplasm granular. There are often small vacuoles within the cell body. The mast cell of the tissues (histogenic mast cell) is a rounded, flattened, or spindle-shaped cell, with a large number of discrete granules of conspicuous size, staining intensely, metachromatically, with aniline dyes. All these cells may be considered as distinct from the fixed connective-tissue cells, and there is a possibility that they may interchange one with another.

Examples of suppurative inflammation show not only round cells, but a preponderance of cells with horseshoe-shaped nuclei, as well as of cells with two or three fragments of nuclei (*Plate IV*, 12). The fragmented appearance is due either to cross-cutting of normal polynuclear cells, or to pathological breaking-up (karyorrhexis) of the leucocytes from autolytic change. The presence of these cells is distinctive enough for diagnosis.

iii. *Multinucleate Cells. Giant Cells.*—Such cells occur in the following tissues, in order of importance :—

The giant cell of a *myeloid sarcoma* (myeloma) (*Plate IV*, 15, and *Plate X, Fig. I*) is large, and its nuclei are scattered irregularly through the cell body. It does not tend to throw out a pseudo-pod-like process. The nuclei stain lightly, and possess no characteristic structure. The surrounding cells are mostly spindle cells like those of sarcoma.

The giant cell of *tubercle* (*Plate III, Plate IV*, 16) is sometimes very large, usually rather smaller than the preceding, and has peripherally arranged nuclei which stain deeply. The cell body runs out into slender processes and lies in a lymph space. The neighbouring cells entirely differ from those round the preceding type. Tuberculous giant cells often occur in pairs. Their nuclei are not *always* peripheral, but search through a specimen will show that most of the giant cells have peripheral nuclei. It depends on the direction of the section as well as on abnormalities of type.

The giant cell of *lymphosarcoma* (*Plate IV*, 17) contains *only three or four nuclei*, which are very large, stain deeply, and are usually not discrete, but appear as huge buds from a central nuclear mass. Another feature is that no two giant cells appear alike, whereas in both the preceding cases the arrangement of the nuclei in one cell is very similar to that in any other. The surrounding cells are usually large and round, with small cell body and deeply-staining nucleus. The corresponding cells in *lymphadenoma* present little difference. Perhaps the only criterion, apart from other minute differences as regards the accompanying cells, is the relative numbers of giant cells to ordinary cells. The lymphosarcoma shows numerous multinucleate cells.

The giant cell of *syphilis* (*Plate IV*, 18) (tertiary lesions and sometimes in chancres) is small, but has a large cell-body compared with the size of the nucleus ; the cytoplasm is dusky and granular ; the nuclei number only two or three, and are discrete and exhibit no definite arrangement. The caseous substance close by further differentiates the variety, for these cells occur in the cell infiltration surrounding the central necrotic mass in the case of gummata. In chancres, look for round-celled infiltration and plasma cells.

The giant cell of *actinomycosis* (*Plate IV*, 20) is also a small one, and contains only a few discrete nuclei. Its cell substance is granular, but not more transparent than that of the preceding. The individual nuclei are large, and show a well-marked chromatin network, with a clearly-defined contour. They are quite close to the central ray-fungus.

The giant cell of *leprosy* nodules (*Plate IV*, 19) is large, has a hyaline protoplasm, with one or several small round nuclei, and often has a large vacuole in its cell body, the vacuole being filled by numerous leprosy bacilli as well as by filamentous remains of the liquefied cytoplasm. As the vacuole increases in size, the nuclei are forced to the periphery of the cell. The surrounding cells are "small round cells," with a few fibroblasts.

The giant cell of *polymorphous-celled sarcoma* (*Plate IV*, 21) is large, and its general characters are very like those of lymphosarcoma already described. The distinction is easy, owing to the abundance of cells in its vicinity, all of which differ in shape—some polygonal, some round, most spindle-shaped.

The giant cell of *osteosarcoma* (*Plate IV*, 22) is one of the largest met with. The cell body has a smooth contour, is rounded, and is abundant compared with the nuclei. The nuclei are also large, closely huddled together, as if arising by budding from a single nucleus, the buds remaining attached to each other. The nuclear substance is clear, with numerous chromatic markings which have a characteristic appearance, and several nucleoli as well. Such a giant cell will have as its neighbours cells of all sizes and shapes, and many of them show mitotic figures of aberrant type. The presence here and there of cells with monstrous single intensely staining nuclei is also most remarkable, and the formation of bone here and there clinches the diagnosis.

The giant cells met with in some *carcinomas* (*Plate IV*, 23, *Plate V*, *c*) and epitheliomas are similar to those described under lymphosarcoma. Possibly some of those tumours (e.g., arising in branchial clefts or in the Fallopian tube) are really sarco-carcinomas or mesotheliomas (Adami). The nuclear characters of the concomitant cells are characteristic, and will be described presently.

The same may be said about the giant cell of *chorio-epithelioma*. There is a strong family resemblance between many of these growths and the lymphosarcoma of the neck or carcinoma of branchial clefts. The giant cell of the *gangliform neuroglioma* is like the nerve cell of the anterior cornu, save for the double or triple nucleus. A single nucleolus in each nucleus is characteristic, as well as the general cell-character of the tumour.

The giant cell met with in *chronic inflammations* due to any cause (many of the cases are possibly syphilitic)* is similar to that met with in syphilis and leprosy. The cell is large, the cytoplasm fairly abundant, and the small number of nuclei are scattered irregularly through the cell body. They are really syncytial forms due to the fusion of adjacent lymphocyte descendants (polyblasts), and are specially met with in cases of chronic inflammation produced by an aseptic foreign body. Possibly all giant cells of inflammatory tissues are signs of a toxic substance being persistently present. The associated cells which have already been described under round-celled infiltration, are an important index to the correct diagnosis, and must be carefully studied in doubtful cases. It is well to look carefully at the giant cells, and note if there be any unusual included body, as in inflammations due to rare causes the causative agent is likely to be present within the giant cell, whose function is pre-eminently phagocytic. In searching for such included bodies, the changes taking place in leucocytes or other cells that are included

* Perhaps most of the inexplicable cases are really syphilitic.

must not be allowed to lead into the error of mistaking them for pathogenic organisms. Reference to the illustrations may serve as a guide in cases of this kind of difficulty.

The giant cells of *normal bone*—the osteoclasts—are characteristic enough. Their situation in Howship's lacunæ in immediate relation to bony trabeculæ is sufficient criterion of their nature. Their presence in a section must not, therefore, be confused with myelomas, especially the cystic forms, or osteosarcomas.

iv. *Carcinoma Cells.*—The *squamous carcinomata* are readily diagnosed by the strongly epithelial type of cell, the presence of cell nests, the abundance of mitoses, the invasion of the deep tissues, and the intense irregularity of their growth. The only possible error which may arise in the case of everyday practice is that of mistaking for carcinoma the atypical proliferation occurring at the edge of very chronic ulcers. The proliferation here is, however, very slight, and the papillæ can be readily seen to possess regularity and to be only suspicious by reason of their size. The tongues of epithelium in an epithelioma spread in every conceivable direction. Never diagnose "papilloma of the bladder" unless the section provided shows the pedicle free from invasion by growth.

v. The *columnar carcinomata* (*Plate X, Fig. K*) and the *glandular tumours* are readily identified by the following rule: malignant tumours have no sharp line of demarcation, infiltrate tissues other than that in which the columnar or glandular epithelium is normally met with, and the gland-spaces are highly irregular in conformation and very closely packed together. The cytological details may here be passed over.

The *spheroidal-celled carcinomata* and the *sarco-carcinomata* (mesotheliomas) have a cell character which is peculiarly their own, and though the types met with are not always present in every case, there is a certain family resemblance between all these cells which is of great assistance in diagnosis. By calling attention to the minute cell character of these tumours it is not intended to suggest that a diagnosis of carcinoma can be made from cell structure alone. It is of the highest importance to ascertain the mode of growth, the infiltration of healthy tissues, and the spread along the vascular spaces of the tissues, as well as the arrangement of the tumour cells themselves into acinous groups, whether they are solid or hollow. It has been stated frequently that certain normal tissues may show cells of the parenchyma whose nuclei are indistinguishable from those of tumour cells. At the same time, this kind of tissue is rarely met with, and the fact that there is no tumour formation is quite sufficient to prevent any mistake. The explanation of nuclear appearances in new growth is unquestionably that the cells are unduly active, and that they readily undergo degenerative changes, just the same as growing normal tissues are actively multiplying and in some cases actively degenerating.

The following points about carcinoma cells may, however, be referred to as an auxiliary guide in diagnosis: (*a*) Their relatively large size; (*b*) The pallor of their cytoplasm; and (*c*) The transparency

of their nuclei. This is really the striking contrast between sarcoma and carcinoma cells (by "carcinoma" I refer to "spheroidal-celled carcinoma"). The nucleus of the sarcoma cell is trachychromatic, that of the carcinoma amblychromatic. (*d*) Another point is the relative size of cell body to nucleus. In the sarcoma, the nucleus is the most conspicuous; in the carcinoma, the cell body is quite as conspicuous as the nucleus. (*e*) The structure of the nucleus. There are minute granules collected towards the periphery of the nucleus, mostly small, but a few large granules occur also. There are several scattered, large, rounded (not polygonal, as in some normal gland-cell nuclei) masses of chromatin, which tend to pass off into three or four slender processes. (*f*) The presence of conspicuous nucleoli (often two in carcinoma; almost invariably two in atypical sarcomata or sarco-carcinomata). (*g*) The cells are frequently strikingly variant in size: some are small, others are really gigantic, compared with a red cell. (*h*) Coincident with this is a striking variation in the intensity of staining of the nucleus. Trachychromatic nuclei may be found here and there in a carcinoma. This and the last feature are not met with in medullary cancers of the breast or of the uterus, to any noteworthy degree: the characteristic applies to cancers in internal organs, such as the liver, pancreas, stomach, kidney, lung, spine, Fallopian tube, and ovary. (*i*) Mitoses (*Plate V*) are very numerous, and tend to be abnormal in having their chromatin collected round three centrosomes. The variations of the mitotic figure also include cases in which the mitosis is asymmetrical, the two daughter nuclei being unequal in size and the larger one hyperchromatic (*Plate IV*, 25). Four diasters have been described, also two side by side, also cases in which the chromatin masses vary greatly in size and pass towards the centrosomes at different rates of speed. As regards the nucleolus, irregularities of characteristic form may be noticed. Thus the nucleus may be multilobar, each lobe containing a separate nucleolus, or a single nucleolus may occur which has an irregular spiny form staining more intensely than the nuclear network; or again, a single nucleolus may occur at one side of the nucleus, as if about to be extruded; and in some cases, again, the nucleus may be found in the cell body, either close to the nucleus or at some distance from it, and may even show buds at its site in the cell body. These variations are, as said before, probably merely the outcome of great rapidity of growth and rapidity of multiplication, as well as being dependent upon perverted metabolism. Even though these changes may be found in young growing tissue, or in tissues in which healing is going on after an injury, yet the frequency of the phenomenon in cancers will not fail to be a guide in practical diagnosis. (*j*). The presence of Plimmer's bodies and Russell's bodies is another characteristic when it occurs, and may be used for diagnostic purposes whether we are prepared to regard them as parasites, or are prepared to look upon them as a result of irregularity of mitosis, or amitosis, or, more improbably, regard them as phagocytic or degenerative appearances

(*Plate IV*, 30). It is interesting to note that injections into the peritoneal cavity in guinea-pigs of carcinoma cells, of placental tissue, of spermatozoa, of sarcinæ, or even of liver cells, has produced the appearance in the phagocytic cells of a body exactly similar to those described by Plimmer. However, they are frequently seen, not only in actively growing spheroidal-celled cancers, but also in the cutaneous epitheliomas.

There remains now the diagnosis of some of the more special tumours and tissues whose aspect is so characteristic that the careful cytological studies so far dealt with become superfluous.

Innocent Tumours. — Lipoma, chondroma, osteoma, angioma, myxoma, papilloma, dermoid cyst, adenomas of breast, thyroid, kidney, and ovary. These are simply accumulations of tissue which normally occurs in the body, and are easily named by latinizing the name of the tissue (*Plate VI, Fig. B*).

Malignant Tumours. — Melanotic sarcoma, endothelioma, alveolar sarcoma, rodent ulcer, scirrhous cancer, papillary cancer, colloid cancer, adenosarcoma, embryoma.

Melanotic Sarcoma.—The characteristic here is the chromatophorous or pigment-bearing cell. The pigment is brown, not black (therefore not carbon), and is wholly intracellular. The granules vary much in size, and may be so abundant as to obscure the cell altogether. Pigment also occurs in small cells scattered through the interstitial tissue. The pigment bearing cells are grouped mostly round the vessels, although the pigment is not iron-containing. The other cells of the tissue are polymorphous.

Endothelioma (*Plate VII*).—Note solid masses of cells, closely packed and without intervening tissue. Slender capillaries can be seen running through the section. At the edge of these vascular spaces the cells tend to a columnar shape. They stain deeply and are small in size. There are several types of endothelioma. The one occurring in the parotid is characterized by the presence of wisp-like clusters of cells lying in an abundant fibrous connective tissue. Here there is a proliferation of scanty lymphatics. In the meninges and thyroid, solid masses of tissue occur. In the skin again, the groups of cells tend to cavity formation in the centre. The only important one, to the student, is the type that occurs in the parotid. Contrast its aspect with that of a scirrhus containing an excessive amount of fibrous tissue.

Alveolar Sarcoma.—Here the cells are arranged into groups separated from one another by a connective-tissue stroma which is rich in blood-vessels. This kind of growth could only be mistaken for a carcinoma, but the small size of the cell, the trachychromatic nuclei and scanty cytoplasm, and the absence of definition to the "alveoli," will decide.

Rodent Ulcer.—This is characterized by the presence of cells like carcinoma cells occurring in several large discrete masses beneath the skin and forming an ulcerated surface. The peripheral masses show

no tendency to the formation of horn, and in each group of cells the outer ones tend to a columnar shape, the inner ones are polygonal. The cells stain more deeply than in an epithelioma (the only growth with which this might be confused). (*Plate IX, Fig. G*).

Scirrhus.—Note small, cigar-shaped acini separated by an excess of white fibrous tissue. (*Plate VIII, Fig. F*).

Papillary Cancer.—Here there are slender, filamentous papillæ growing into a fluid-containing cavity. The cells are columnar, or the central core of fibrous tissue may be covered by a more or less stratified epithelium. The malignancy is determined by the tendency of the same kind of tissue to grow into the capsule.

Colloid Cancer.—The appearance is easily recognized. Note scanty groups of degenerate (poorly staining) cancer cells arranged in slender strands and separated by a considerable amount of almost transparent material (mucinous). There is an indication of alveolar arrangement limiting off the groups of cells. Areas of hæmorrhage about the tissue may be noticed.

Adenosarcoma.—Note gland spaces whose lining cells are cubical or columnar, and usually in single layer. The lumina are tortuous but narrow. These spaces are separated by a very cellular tissue composed of short thick oat-shaped cells.

Embryoma. Teratoma.—This is a tumour composed of a number of different kinds of tissues distributed amongst one another in an irregular fashion. Thus there are adenoid tissue, muscular tissue, cartilage, sarcoma-like tissue all present here.

Maligno-Innocent.—*Hypernephroma* (*Plate XI*).—The lower power shows the characters best. Kidney substance will be readily made out on one side, and new growth on the other, the two being separated by a band of fibrous tissue, indicative of non-malignancy of the growth. The tumour itself has a characteristic appearance, being lobulated by slender trabeculæ, and possessing cells with very clear protoplasm (really fatty, but this has dissolved out in finishing the section). The nucleus is very small compared with the cell body. The growth is very vascular, and there may even be extensive hæmorrhages. The best conception of the architecture of this type of growth (which is a suprarenal rest tumour) is that it is a blood-vessel tumour, the cells lining the vessels being the pale fatty cells with small nucleus already described, arranged at right angles to the blood-stream. This accounts for the occurrence of numerous hæmorrhages, the blood being enclosed by the same peculiar cubical cells.

Special Tissue.

Diseases of the Lung.—*Pneumonia.*—The appearances of pneumonic lung are quite characteristic and are readily referred to in the common text-books. Note, however, the high-power character of the exudate within the particular alveoli. This not only shows what stage of pneumonia is reached, but also prevents a mistake of lobar for lobular (broncho-) pneumonia. The lobar type has a great preponderance of

leucocytes of various kinds, and very few alveolar epithelial cells, whereas in bronchopneumonia the alveolar cells are much the more numerous; besides this, the alveoli are not so tightly packed with the exuded cells as in lobar (fibrinous or croupous) pneumonia. The absence of threads of fibrin also serves to differentiate lobular from lobar pneumonia.

Chronic Pneumonia.—The usual cardinal signs of chronic inflammation occur. Notice the great thickening of the alveolar wall with fibrous tissue, and the heavy deposit of carbon (dead black) in the connective tissues. In some places the alveoli may be very large (local emphysema).

Stonemason's Lung (*Plate XII*).—Notice the changes of chronic pneumonia, with the presence of whorled masses of fibrous tissue, containing black or brownish patches in concentric laminæ. The absence of tubercles in a tissue otherwise like chronic tuberculosis, leads to the correct diagnosis of one (one cannot generally say definitely which) of the pneumokonioses.

Septic Infarct.—Note the normal lung tissue rather sharply defined from an area which is histologically acute pneumonia. The central parts of this patch will be found largely necrotic. The edges will be densely infiltrated with polynuclear cells.

Diseases of the Liver.—*Bacillus Aerogenes Capsulatus Infection.*—This is a post-mortem change, but easily identified (foaming liver) The normal structure of the liver is lost. The cells are much shrunken and hardly distinguishable as liver cells. There are numerous spaces of varying size, but almost quite circular, and close inspection shows that these spaces are thickly lined by bacilli. These are also scantily distributed throughout the tissue.

Thrombosis of the Portal Vein.—Here any search for normal liver tissue will probably be in vain. There is only a mass of inflammatory cells (lymphocytes, plasma cells, connective-tissue cells), and probably some disorganized liver cells completely devoid of arrangement into lobules. In some parts there is much fibrous tissue, amongst which are very large vessels choked with blood.

Gumma.—Notice the sharp outline of the mass, very little inflammatory infiltration of the edge, no tubercles, distinct white hyaline line limiting the inflammatory layer from the dead homogeneous substance which forms the main mass of the nodule. If there are any dark-blue irregular masses of small size scattered here and there in the caseous part, they will be calcareous particles, which often occur in gummata. Note that in large solitary tubercles the inflammatory zone blends off gradually; there are generally giant cells present; there is no hyaline line (*Plate VI, Fig. A*).

Cirrhosis.—The presence of strands of fibrous tissue of conspicuous size, enclosing either groups of liver lobules (multilobular) or individual ones (unilobular), the fibrous tissue, showing elongated patches of inflammatory cell infiltration, sufficiently distinguishes this disease. The details can readily be studied in the ordinary text-books, and it is superfluous to say more about them here.

Specimens of Kidney. — *Chronic Nephritis.* — Notice the marked increase in the amount of connective tissue between the tubules, especially near the surface of the kidney. The epithelium of the tubules is in a state of cloudy swelling. Throughout the thickness of the kidney, the blood-vessels are very conspicuous by reason of their dilatation, and the great thickness of their walls. The interstitial tissue around the vessels is densely infiltrated by inflammatory cells, and lymphocytes are diffused not only in the interstitial tissue, but also even into the lumen of the degenerated tubules. Hyaline casts can be seen in section in many of the tubules. The capsules of the glomeruli are becoming encircled by fibrous tissue. In some specimens the tubules are found to be much distended here and there. This is because the pressure of the fibrous tissue causes the tubules above to swell by back pressure. The scattered degenerative change of the epithelium is due to local interference with blood-supply produced by the vascular changes.

The presence of blood-vessels with thickened walls, especially if the lumen is becoming constricted ; the formation of numerous fibro-blasts, and the occurrence of numerous aggregations of small round cells, are three cardinal signs of chronic inflammation of any given tissue.

Passive Congestion.—Here note the great distention of the blood-vessels without signs of inflammatory exudation between the tubules. Some degenerative changes of the tubular epithelium may be expected.

Suppurative Nephritis (*Surgical Kidney*) (*Plate IX, Fig. H*).—Notice (1) Excess of fibrous tissue, with conspicuous, thick-walled blood-vessels ; (2) Great diminution in the number of renal tubules and filling up of the lumina of the remaining ones by casts and pus-cells ; (3) Hyaline degeneration of most of the glomeruli ; (4) Atrophy, with great narrowing of the tubules ; (5) Presence of numerous small suppurative foci.

Septic Embolus.—The tubules are largely normal. There are also no interstitial changes. In one place will be seen a small area of disease, shown by a central focus of leucocytes, enclosed in a zone of dilated blood-vessels, and this again by compressed tubules which have been pushed against their fellows by the exudation at the site of the disease. There is a tendency to necrosis in the centre of the small inflammatory nodule. The localized disease leads one to ponder over the possible source of a small rounded focus of acute inflammatory infiltration, with damage to the neighbouring proper gland-tissue. The only possible cause is an embolus. Specially prepared sections would show clusters of micro-organisms.

Molluscum Contagiosum.—A section through a lesion due to this cause will show a few oval spaces lined by concentric layers of epidermal cells situated entirely in the epidermis. The spaces are filled with small, well-defined oval bodies, whose poles are often deeply stained. These are coccidia, and are characteristic.

Ulcer of the Intestine.—There will usually be no difficulty in deciding upon the nature of an ulcer on merely general rules. A decision

between typhoid and dysenteric ulcer depends upon the character of the edge of the ulcer, the depth to which tissue destruction has proceeded, and the occurrence of extreme inflammation of lymphoid follicles.

Curettings.—A point which has to be borne in mind is the detection of chorionic villi in cases of retained placenta. There is no need to do more than mention this possibility.

Diseases of Spleen and Glands.—Leukæmia affecting these organs is a condition which has to be remembered The changes are difficult to identify with the microscope, because they depend entirely on the changes of type of the cells of the splenic pulp and of the lymph-gland follicles. The presence of numerous infarcts, cellular increase, fibrous overgrowth, and phagocytic activity only forms part of the total change. The identification of myelocytes of various kinds, and of large lymphocytes, is a matter of the greatest difficulty. It is not possible to enter into the characters of these different cells, as that involves a full description of all the blood cells and their parents. This applies not only to splenic leukæmia but to lymphatic leukæmia.

Lymphadenoma. — The identification of this is also difficult when the main facts are the presence of a great increase in the amount of stroma in the lymph glands, with the development of numbers of giant cells (containing four to twelve nuclei) in connection with the fibrous trabeculæ, being often gathered into clusters, while the fibrous change is progressing The hard glands show practically no gland stroma, and are almost entirely converted into fibrous tissue. Note (1) Loss of normal structure of gland : it has become homogeneous in structure ; (2) Preponderance of trabeculæ over proper cells of gland ; (3) Increase in size and number of endothelial cells, with conversion of many into giant cells ; (4) Frequently great increase in number of eosinophile cells. Mitotic figures may be seen in unusual number in the endothelial cells.

So much for the commonest specimens which may cause difficulty. In conclusion, the observer is strongly advised to look at his section first with the naked eye, then use the low power, and finally the high power. Scour every part of the section to see if there be any relics of the organ from which the tissue is derived. If it be a tumour, study the cells and the relations of one to the other, as well as the relations between cells and stroma, between stroma and normal tissue. If it be a degenerate organ, remember amyloid, fatty, or other degeneration. If it be obviously an inflammatory ailment of the organ, pass in review all the conditions to which the organ is liable, and decide accordingly. There is nothing so useful as an occasional careful study of normal histological preparations, as well as of the stock preparations which the student receives during histology courses. In the diagnosis of operation material, where a question of malignancy arises, it is a good rule to regard an operation as indicated wherever there is the slightest element of doubt in favour of malignancy.

THE PRACTICE OF PHARMACY AND THE SALE OF MEDICINES.

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THE PHARMACY ACTS IN THEIR RELATION TO MEDICAL PRACTICE.

Pharmacy legislation in this country dates from 1852, in which year "An Act for regulating the Qualifications of Pharmaceutical Chemists" (15 & 16 Vict., Cap. 56) was enacted. This Act confirmed the Charter, granted in 1843 to the Pharmaceutical Society of Great Britain, and provided for a register of pharmaceutical chemists being made and maintained, with the express stipulation: "That no person who is a member of the medical profession, or who is practising under right of a degree of any university, or under a diploma or licence of a medical or surgical corporate body, shall be entitled to be registered under this Act; and if any registered pharmaceutical chemist shall obtain such diploma or licence, his name shall not be retained on the said register during the time that he is engaged in practice as aforesaid."

The Act in no way restricted the practice of pharmacy or the sale of poisons, and it was not until sixteen years later that an "Act to regulate the sale of poisons, and alter and amend the Pharmacy Act, 1852," came into operation. This Act, which is known as "The Pharmacy Act, 1868" (31 & 32 Vict., Cap. 121) provided, *inter alia*, that in future it should be unlawful for any person to sell or keep open shop for retailing, dispensing, or compounding poisons, or to assume or use the title chemist and druggist, or chemist, or druggist, or pharmacist, or dispensing chemist, or druggist in any part of Great Britain, unless such person was registered as a pharmaceutical chemist, or chemist and druggist, and conformed to such regulations as to the keeping, dispensing, and selling of such poisons, as might be prescribed from time to time by the Pharmaceutical Society with the consent of the Privy Council. Poisons were defined as the several articles named or described in a schedule to the Act, together with such articles as might be added thereto in a manner specified. This schedule of poisons has been now replaced by one in a later Act (Poisons and Pharmacy Act, 1908 (8 Edw. VII., Cap. 55), which we will hereinafter consider in detail.

Chemists and druggists within the meaning of the 1868 Act are those who were practising as such before the passing of the Act; and others who satisfy certain conditions as to training, and pass certain examinations.

Medical men may also be on the register of chemists and druggists, and moreover Section 16 of the Act provided that: "Nothing hereinbefore contained shall extend to or interfere with the business of any legally qualified apothecary;" and an amending Act passed in the following year, "Pharmacy Act, 1869" (32 & 33 Vict., Cap. 117), amplified this, so that the exemption might extend to every person who was registered as a legally qualified medical practitioner before 1869, and to every person who should thereafter be registered as a legally qualified practitioner, and who, in order to obtain his diploma for such registration, should have passed an examination in pharmacy.

As the course of professional study and examination laid down by the General Medical Council includes pharmacy as a compulsory subject, this practically exempts all medical men from the operation of the first fifteen sections of the Pharmacy Act, 1868.

There remains, however, Section 17, which deals with regulations to be observed in the sale of poisons. As this is of considerable importance, it may be well to quote it in full:

"It shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover, in which such poison is contained, be distinctly labelled with the name of the article, and the word 'poison'; and it shall be unlawful to sell any poison of those which are in the first part of Schedule (A) to this Act, or may hereafter be added thereto under Section 2 of this Act, to any person unknown to the seller, unless introduced by some person known to the seller; and on every sale of any such article the seller shall, before delivery, make or cause to be made an entry in a book to be kept for that purpose, stating, in the form set forth in Schedule (F) to this Act, the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser and of the person, if any, who introduced him shall be affixed; and any person selling poison otherwise than is hereinprovided, shall, upon a summary conviction before two Justices of the Peace in England, or the Sheriff in Scotland, be liable to a penalty not exceeding five pounds for the first offence, and to a penalty not exceeding ten pounds for the second or any subsequent offence, and for the purposes of this Section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller; but the provisions of this Section, which are solely applicable to poisons in the first part of the Schedule (A) to this Act, or which require that the label shall contain the name and address of the seller, shall not apply to articles to be exported from Great Britain by wholesale dealers, nor to sales by wholesale to retail dealers in the ordinary course of wholesale dealing, *nor shall any of the provisions of this Section apply to any medicine supplied by a legally* qualified apothecary to his*

*Extended to all legally qualified medical practitioners by the Pharmacy Act, 1869.

patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act; provided such medicine be labelled in the manner aforesaid, with the name and address of the seller, and the ingredients thereof be entered, with the name of the person to whom it is sold or delivered, in a book to be kept by the seller for that purpose; and nothing in this Act contained shall repeal or affect any of the provisions of an Act of the Session holden in the fourteenth and fifteenth years in the reign of her present Majesty, intituled 'An Act to regulate the sale of arsenic.'"

It will be noticed that medical men are only exempt from the provisions of the clause, and from the penalties attached to the neglect thereof, if any medicine they supply to their patients, which contains any scheduled poison, is labelled legibly and distinctly with the name and address of the seller (i.e., the medical man); and the ingredients of the medicine, with the name and address of the person to whom it is sold and delivered (i.e., either the person to whom it is actually delivered, or the patient for whom it is intended),* are entered in a book kept by the medical man for that purpose.

It is therefore necessary to be familiar with the schedule of poisons now in force, which is that appended to the Poisons and Pharmacy Act, 1908, in the following terms:—

PART 1.

Arsenic, and its medicinal preparations.
Aconite, aconitine, and their preparations.
Alkaloids—all poisonous vegetable alkaloids not specifically named in this schedule, and their salts, and all poisonous derivatives of vegetable alkaloids.
Atropine, and its salts, and their preparations.
Belladonna, and all preparations or admixtures (except belladonna plasters) containing 0·1 or more per cent of belladonna alkaloids.
Cantharides, and its poisonous derivatives.
Coca, any preparation or admixture of, containing. 1 or more per cent of coca alkaloids.
Corrosive sublimate.
Cyanide of potassium, and all poisonous cyanides and their preparations.
Emetic tartar, and all preparations or admixtures containing 1 or more per cent of emetic tartar.
Ergot of rye, and preparations of ergots.
Nux vomica. and all preparations or admixtures containing 0·2 or more per cent of strychnine.
Opium, and all preparations or admixtures containing 1 or more per cent of morphine.
Picrotoxin.
Prussic acid, and all preparations or admixtures containing 0·1 or more per cent of prussic acid.
Savin, and its oil, and all preparations or admixtures containing savin or its oil.

PART 2.

Almonds, essential oil of (unless deprived of prussic acid).
Antimonial wine.
Cantharides, tincture and all vesicating liquid preparations or admixtures of.

* See judgment in Berry *v.* Henderson, L.R. 5 Q.B. 296.

Carbolic acid, and liquid preparations of carbolic acid, and its homologues containing more than 3 per cent of those substances, except preparations for use as sheep-wash, or for any other purpose in connection with agriculture or horticulture, contained in a closed vessel distinctly labelled with the word "Poisonous," the name and address of the seller, and a notice of the special purposes for which the preparations are intended.
Chloral hydrate.
Chloroform, and all preparations or admixtures containing more than 20 per cent of chloroform.
Coca, any preparation or admixture of, containing more than 0·1 per cent, but less than 1 per cent, of coca alkaloids.
Digitalis.
Mercuric iodide.
Mercuric sulphocyanide.
Oxalic acid.
Poppies, all preparations of, excepting red poppy petals, and syrup of red poppies (*Papaver rhœas*).
Precipitate, red, and all oxides of mercury.
Precipitate, white.
Strophanthus.
Sulphonal.
All preparations or admixtures which are not included in Part 1 of this Schedule, and contain a poison within the meaning of the Pharmacy Acts, except preparations or admixtures the exclusion of which from this Schedule is indicated by the words therein relating to carbolic acid, chloroform, and coca, and except such substances as come within the provisions of Section 5 of this Act.

It will be noticed that, in addition to the substances specifically named in the Schedule, others are included by implication. Thus, all poisonous vegetable alkaloids and their salts, and all poisonous derivatives of vegetable alkaloids, are in Part 1.

What is a poisonous vegetable alkaloid or a poisonous derivative of a vegetable alkaloid, is a question of fact to be determined by expert evidence, chemical as to nature and constitution, and medical as to toxicity.

Again, the general clause at the end of Part 2 brings into the schedule many substances, some of which are not usually regarded as poisons.

The following list gives all the substances in general use in medicine, which are, in my opinion, after consideration of their chemical nature, and their toxicity as recorded by medical authorities, included within the Schedule. Medicines containing any one or more of these should, therefore, be only supplied by medical men to their patients in bottles or other containers labelled with the name and address of the supplier, and after the prescription for the medicine has been entered in a book, together with the name and address of the patient.

	PARTS		PARTS
Acetomorphine (heroin)	1	Antimonial wine	2
Aconitine	1	Apomorphine hydrochloride ..	1
,, ointment	1	Aromatic powder of chalk with opium	2
Alcoholic extract of belladonna ..	1	Arsenic (arsenious anhydride)	1
Ammoniated mercury	2	Arsenical solution	1
,, ,, ointment	2	Arsenium bromide	1
Ammoniated tincture of ergot	1	,, chloride	1
,, ,, of opium	2		

	PARTS
Arsenium iodide	1
Atropine ointment	1
,, discs (lamellæ)	1
Belladonna juice	2
,, ointment	1
,, plaster	2
,, suppositories	1
Benzylmorphine hydrochloride (peronin)	1
Blistering collodion	2
,, liquid	2
Cacodylic acid	1
Cantharides ointment	2
,, plaster	2
Cantharidin	1
,, preparations	2
Carbolic acid	2
,, ,, suppositories	2
,, ,, lozenges	2
Cherry laurel water	1
Chloral hydrate	2
Chlorodyne	2
Chloroform	2
,, of belladonna B.P.C.	1
Cocaine	1
,, discs (lamellæ)	1
,, hydrochloride	1
,, ointment	1
Codeine	1
,, phosphate	1
Colchicine	1
,, salicylate	1
Colocynth and hyoscyamus pills	2
Compound of hypophosphites	2
,, kino powder	2
,, lead suppositories	2
,, opium powder	1
,, powder of ipecacuanha	1
,, soap pills	1
,, syrup of glycerophosphates B.P.C.	2
,, tincture of camphor	2
,, ,, chloroform and morphine	1
Coniine	1
,, hydrobromide	1
,, hydrochloride	1
Corrosive sublimate	1
Cotarnine and its salts	1
Cresol soap solution	2
Cyanide of mercury	1
Digitalis juice	2
Dilute hydrocyanic (prussic) acid	1
Easton's syrup	2
Ergot of rye	1
Essential oil of bitter almonds	1
Ethereal tincture of belladonna	1

	PARTS
Ethylmorphine hydrochloride (dionin)	1
Eucodeine (methyl codeine bromide)	1
Eumydrine (methyl atropine nitrate)	1
Euporphine (apomorphine methyl bromide)	1
Extracts of belladonna	1
Extract of Calabar beans	2
,, colchicum	2
,, ergot	1
,, hyoscyamus, green	2
,, nux vomica	1
,, opium	1
,, stramonium	2
,, strophanthus	2
Gall ointment with opium	2
Gelsemine	1
,, hydrochloride	1
Glycerin of belladonna B.P.C.	1
,, carbolic acid	2
Hemlock juice	2
Homatropine discs (lamellæ)	1
,, hydrobromide	1
Hydrochloric solution of arsenic	1
Hyoscine hydrobromide	1
Hyoscyamus juice	2
Hyoscyamine hydrobromide	1
,, sulphate	1
Hypodermic injection of apomorphine	1
Hypodermic injection of atropine	1
,, ,, cocaine	1
,, ,, ergot	1
,, ,, morphine	1
Infusion of digitalis	2
,, ergot	1
Ipecacuanha pills with squill	2
,, wine	2
Iron arsenate	1
Krameria and cocaine lozenges	2
Laudanum	2
Lead pills with opium	1
Liquid carbolic acid	2
,, extract of belladonna	1
,, ,, coca	2
,, ,, colchicum	2
,, ,, ergot	1
,, ,, ipecacuanha	2
,, ,, jaborandi	2
,, ,, nux vomica	1
,, ,, opium	2
Liniment of aconite	1
,, belladonna	1
,, chloroform	2
,, opium	2
Linseed, liquorice, and chlorodyne lozenges	2

	PARTS
Mercuric iodide	2
,, ,, ointment	2
,, oxide	2
,, ,, ointment	2
,, sulphocyanide	2
Morphine	1
,, acetate	1
,, hydrochloride	1
,, and ipecacuanha lozenges	2
,, lozenges	2
,, sulphate	1
,, suppositories	1
,, tartrate	1
Morphosan (morphine methyl bromide)	1
Narcyl (ethyl narceine hydrochloride)	1
Oil of savin	1
Oleate of mercury	1
Opium	1
,, lozenges B.P.C.	1
,, plaster	1
Oxalic acid	2
Oxysparteine hydrochloride	1
Paregoric elixir	2
Perchloride of mercury	1
Physostigmine sulphate	1
,, or eserine discs (lamellæ)	1
Picrotoxin	1
Pilocarpine nitrate	1
Potassium cyanide	1
Quinine arsenate	1
Red precipitate	2
Sal alembroth	2
Sodium arsenate	1
,, cacodylate	1
,, metharsenite	1
Solution of arsenious and mercuric iodides (Donovan's solution)	1
Solution of atropine sulphate	1
,, mercuric chloride	2
,, morphine acetate	1
,, ,, hydrochloride	1
,, morphine sulphate	1
,, ,, tartrate	1
,, sodium arsenate	1
,, strychnine hydrochloride	1
Stavesacre ointment	2
Strychnine	1
,, hydrochloride	1
Sulphonal	2
Syrup of chloral	2
,, codeine	2
Syrup of phosphate of iron with quinine and strychnine	2
Tartar emetic	1
Tincture of aconite	1
,, belladonna	2
,, cantharides	2
,, colchicum	2
,, digitalis	2
,, gelsemium	2
,, hyoscyamus	2
,, lobelia, ethereal	2
,, nux vomica	1
,, opium	2
,, stramonium	2
,, strophanthus	2
Tropacocaine	1
Veratrine	1
,, ointment	2
Vinegar of cantharides	2
,, ipecacuanha	2
,, opium B.P.C.	2
Warming plaster	2
White precipitate	2

THE BRITISH PHARMACOPŒIA AS A LEGAL STANDARD FOR MEDICINE.

The object of the British Pharmacopœia, as stated in the preface to the 1867 edition, and reiterated in that of 1898, is to afford to the members of the medical profession, and those engaged in the preparation of medicines throughout the British Empire, one uniform standard and guide, whereby the nature and composition of substances to be used in medicine may be ascertained and determined. This implies an obligation on the part of all supplying medicine to see that it conforms to the standards of quality and strength set up by the authority of the General Medical Council in the volume issued in pursuance of the statutory powers conferred on that body by the Medical Acts of 1858 and 1862; and we propose to discuss the question as to how far this moral obligation can be enforced by action of law.

By Section 15 of the Pharmacy Act, 1868 (31 and 32 Vict., Cap. 121), it was enacted *inter alia* that: "Any person . . . who shall compound any medicines of the British Pharmacopœia except according to the formularies of the said Pharmacopœia, shall for every such offence be liable to pay a penalty or sum of five pounds."

It will be noted that the offence is wrongful compounding, and therefore one that is difficult of proof; for the seller is not always the compounder, and the act of selling *per se* is not penalized. When, therefore, it is desired to enforce the standards of the Pharmacopœia by forensic proceedings, action is almost invariably taken under the Acts for making better provision for the sale of food and drugs in a pure state, commonly known as the Sale of Food and Drugs Acts, and an impression prevails in some quarters that the Pharmacopœia is a legal standard by virtue of these statutes. This is not, however, the case; the British Pharmacopœia is not mentioned in any of the Sale of Food and Drugs Acts, although it has been repeatedly suggested that a provision making the Pharmacopœia a standard for such drugs or medicines as are included therein, should be incorporated in these statutes.

Nevertheless, the authority of the Pharmacopœia is continually invoked to support prosecutions alleging that medicinal substances are not of the nature, substance, and quality demanded by the purchaser. There being no statutory standards for drugs, those of the Pharmacopœia are taken as presumptive standards, liable of course to be rebutted, but only by strong evidence of the existence of some other commercial standard. The point has been discussed in a series of cases, which it may be well briefly to review.

In 1887, a chemist in Sheffield, named Bywater, sold some tincture of opium, which on analysis was found to contain less than one-third of the amount of opium prescribed in the Pharmacopœia for this tincture, and only about half the amount of spirit. He was prosecuted

for having sold tincture of opium which was not of the nature, substance, and quality demanded, but in spite of evidence to the effect that only one tincture of opium was recognized by pharmacists or the public, and that an article sold as tincture of opium ought to be the tincture of the British Pharmacopœia, the magistrate declined to convict, stating that he was of opinion that if a preparation contained any opium and any alcohol whatever, it could legally be sold as tincture of opium. On appeal, however, it was held by Lord Coleridge, C.J., and A. L. Smith, J., that the magistrate was wrong, as the tincture of opium supplied was not of the nature, substance, and quality of tincture of opium as understood by persons usually dealing in that article (White *v.* Bywater, L.R. (1887), 19 Q.B.D. 582).

In Dickins *v.* Randerson, L.R. (1901, 1 K.B. 437), a chemist was asked for "mercury ointment," and supplied an ointment containing 12·5 per cent of mercury, whereas according to the formula in the British Pharmacopœia it should contain 48·5 per cent. Evidence was given to show that it was the usual practice amongst chemists to supply the weaker ointment unless the stronger one was prescribed or specially asked for, and indeed that the indiscriminate distribution of the official article would be a source of considerable public danger. The defendant was, however, convicted, and on appeal it was held by Bruce and Phillimore, JJ., rightly so.

Phillimore, J., said: "Appellant was asked for mercury ointment, and should have sold the drug as prescribed in the British Pharmacopœia, or, if he was going to do what he in fact did, sell ointment in which the mercury was only about a quarter of the standard strength, he should, if he sold such a drug at all, have explained that he was selling a weaker or diluted drug, and have so named it. He acted from no sordid motive, but none the less was he in the habit of selling to his customers something that was not of the nature, substance, and quality which they must be taken to have demanded, and which the purchaser in this case certainly demanded. It was said the appellant sold the mercury ointment of commerce, and for commercial purposes there was a difference between that and the standard of the British Pharmacopœia. Having regard to Section 15 of the Pharmacy Acts, that was unlikely, though perhaps possible. The appellant failed altogether to prove that there was a commercial standard for this article different from that of the Pharmacopœia, and he did not even attempt to prove it. What he did attempt to prove was that there were two commercial standards of wide difference, a thing in itself unreasonable, while he said he kept both standards in his shop, and sold one standard or the other, according as customers did or did not bring a prescription from a medical man. He might almost as well keep two weights or two measures. The practical mischief of such a practice was pointed out during the argument. If there was any danger on the other side it was avoided by the simple expedient of calling the two qualities mercury ointment and mercury ointment weak or diluted, and recommending the latter to any customer whom

he might think unskilled and likely to use the proper drug in a dangerous manner. The cases quoted established the fact that if a drug was asked for, that drug must be supplied, and if it was not sold with the ingredients in the proportions prescribed by the British Pharmacopœia, there was at least prima facie evidence that what was sold was not of the nature, substance and quality demanded."

In Boots, Cash Chemists (Southern), Ltd. *v.* Cowling (1903, 67 J.P. 195), the defendants sold liniment of soap made with methylated spirit instead of with rectified spirit as prescribed by the British Pharmacopœia. The defendants wished to call a number of witnesses to prove that there was a commercial standard for liniment of soap different from that prescribed by the British Pharmacopœia, but the magistrate refused to receive it, holding that he was bound not to do so by the decision in Dickins *v.* Randerson (*vide supra*). The defendants appealed to the Divisional Court, the appeal being heard by Lord Alverstone, C.J., and Wills and Channell, JJ., who decided that the evidence ought to have been received, but expressly refrained from expressing any opinion as to what its value might be, and sent the case back for rehearing.

Lord Alverstone, C.J., said: "It was quite clear that Phillimore, J., never meant to lay down in that case (Dickins *v.* Randerson) that nothing could be looked at except the British Pharmacopœia. On the other hand, if it were a sale of some drug recognized by a special name in the Pharmacopœia, a very strong *prima facie* case would be made out as to what the drug ought to contain. Therefore any evidence tendered to show that a commercial standard did exist different from that prescribed by the Pharmacopœia, ought to be received. To say that no evidence of this kind was admissible because of the decision in Dickins *v.* Randerson was, in the opinion of the Court, going too far."

Subsequently the case was reheard by the magistrate, who, however, convicted the defendants on the ground that the standard formula was that of the British Pharmacopœia, and that it had not been proved that there was any other commercial standard, nor was it reasonable to expect that there could be two commercial standards.

In Hudson *v.* Bridge (1903, 67 J.P. 186) vinegar of squills was sold, and was found to contain only 2·5 per cent of acetic acid, whereas it was alleged that it should have contained 4·27 per cent of acetic acid, this being the theoretical amount calculated from the formula of the British Pharmacopœia. Evidence was given that some of the acetic acid is lost in the process of manufacture, and that a further loss takes place in the vinegar on keeping, and moreover that the acetic acid was not the active ingredient of the preparation. The defendant was however convicted, but on appeal it was held by the King's Bench Division that the justices were wrong, the Lord Chief Justice, in giving judgment, expressing the opinion that it was not material that the acetic acid had diminished, as the vinegar of squills as a drug was none the worse.

The general effect of these cases appears to be that when a compound medicine is demanded by a name which occurs in the Pharmacopœia, an article made in accordance with the formula, and answering the tests, if any, of the Pharmacopœia, is presumed to be required, and that only very strong evidence to the contrary will suffice to rebut such presumption.

As regards simple drugs, there are few authoritative cases, and the question of the authority of the Pharmacopœia is complicated by the fact that many articles named in the Pharmacopœia have other uses than their medicinal ones.

Thus in Fowle *v* Fowle (1896, 75 L.T. 514), the defendant, a grocer, sold some beeswax which, on analysis, was found to contain about equal parts of true beeswax and paraffin. The magistrates dismissed the case on the ground that beeswax was not a drug, although evidence had been brought before them to prove that it is used in the preparation of substances for medicinal use, and is included in the British Pharmacopœia. On appeal, the court (Grantham and Wright, JJ.) held that it is a question of fact for the justices to decide whether, in all the circumstances of each case, the article is a drug, and that in the circumstances of this case they were right in holding that the beeswax was not a drug.

The British Pharmacopœia is therefore not a statutory standard for the sale of drugs. Each case is decided by evidence; but the only safe assumption for traders to make is that when any drugs, simple or compound, mentioned in the Pharmacopœia, are sold for medicinal purposes, they should conform to the standards and descriptions of the Pharmacopœia, and answer any tests prescribed therein.

Medical men in prescribing should be careful to specify drugs and pharmaceutical preparations by their official names, adding where there is any risk of ambiguity the distinguishing initials " P. B."

Part II.—The Dictionary of Treatment.

A REVIEW OF MEDICAL AND SURGICAL PROGRESS

FOR 1910. BY MANY CONTRIBUTORS.

Together with a brief Synopsis of Treatment recommended during recent years.

GENERAL REVIEW.

ACUTE INFECTIOUS DISEASES.—Since the condition of hypersensitiveness to serum (usually horse-serum), which is a form of anaphylaxis, has been recognized, considerable attention has been paid to the subject. In the article on anaphylaxis will be found the contra-indications to the use of serum.

Though the intracerebral injection of antimeningococcic serum in cerebrospinal meningitis has been advocated and practised for some time past, no case occurred in which recovery took place until the remarkable one recorded by Fischer, an abstract of which will be found in the present volume.

A short account is given of Gabritschewsky's method of vaccination against scarlet fever in Russia. Should this method be equally successful elsewhere, a notable advance will have been made in the preventive treatment of that disease.

The "carrier" question in typhoid fever still continues to excite much discussion. Though the last word has by no means been said on the subject, it would appear from Thomson's review, of which an abstract is given, that, in this country at any rate, the influence of the "carrier" in the dissemination of the fever is not very potent. Some remarkable results of operation for perforating typhoid ulcer have been obtained by Canadian and American surgeons.—[E. W. G.]

* * * * *

DISEASES OF CHILDREN.—In the feeding of infants no important advance has been made during the past year. The "caloric method," which has found favour in Germany, has rather an academic than a practical interest. A preparation known as albulactin, stated to be a pure soluble form of milk-albumin, is on trial, as an addition to ordinary milk mixtures.

Some important observations on the value of human and rabbit serum in arresting melæna neonatorum have recently been published. Unfortunately, the serum apparently must be fresh, and the difficulty of obtaining it just when wanted may be very great.

The use of soybean for marasmus and for infantile diarrhœa is a recent introduction. In the treatment of round-worms the use of oil of chenopodium is rather a revival of an old practice than a new one: it seems to be of value if given with proper care. For whooping-cough a new drug, eulatin, a compound containing antipyrin, is said to be of service.

Bordet and Gengou's observations on the bacteriology of whooping-cough are of great interest, and give hope of a successful vaccine treatment before long.

Chorea still gives rise to much difference of opinion as to treatment. Arsenious acid given in large doses has been recommended instead of the ordinary liquor arsenicalis; camphor monobromate is a recent drug in the treatment of this disease; whilst another bromine compound for the purpose is sabromin, which is said to have a greater effect than corresponding doses of the ordinary bromide salts, so that it can be given successfully in some cases where the necessary dose of potassium or sodium bromide would not be tolerated.—[G. F. S.]

* * * * *

Gynæcology.—The really outstanding papers on these subjects have not been numerous during the past year. Perhaps that of the greatest value, because it deals with a condition up to now but little known, is an exhaustive review of *Bacillus coli communis* infections of the urinary tract during pregnancy.

The treatment of placenta prævia, with special reference to the performance of Cæsarean section, has received much attention, and the vexed question of the etiology and treatment of eclampsia has been dealt with by several authorities. Papers respectively on depressions of the skull and ophthalmia of the new-born will be found epitomized.

The subject of malignant disease of the Fallopian tube has been exhaustively written upon, and all the knowledge of this rare disease possessed at the present time will be found collected.

Leukoplakic vulvitis and its relation to carcinoma of the vulva and kraurosis vulvæ was brought before the profession at the end of last year in a paper which is reviewed here. Finally, the topics of pelvic pain, uterine myomata, and the treatment of inoperable cancer of the uterus, have received attention.—[V. B.]

* * * * *

Hæmatology.—Considerable progress has been apparent during the year. In technique, several suggestions of value have been made with regard to the enumeration of corpuscles and differential leucocyte count. Brugsch (*Folia Hæmatologica*, 1910) has introduced new methods of estimating the amount of hæmoglobin. Boycott and Chisolm have described a new method of determining the alkalinity of the blood which promises to be of service.

A most important publication is the second part of Pappenheim's atlas of human blood cells (Fischer, Jena). The types of cells which

occur in pathological conditions are beautifully illustrated, and the letterpress contains an elaborate discussion of their genealogy and relationships. The work is one of great value, but it will probably only be appreciated by the specialist and advanced student.

Aynaud has contributed an exhaustive account of the blood plates. Goodall, in the *Journal of Pathology and Bacteriology*, 1910, gives short notes on the blood of the common domestic and laboratory animals, and has collected most of the widely scattered references. Bramwell and Hale White emphasize the importance of examining the blood in cases of spinal sclerosis in view of their common association with pernicious anæmia.

Hæmophilia has been the subject of important research, and the coagulation of the blood has been extensively studied. Banti's disease has been dealt with in several papers, and Paulicek gives full references and an elaborate discussion of the condition. Multiple myeloma is discussed by Hirschfeld.

Ascoli has introduced a new diagnostic method, the meiostagmine reaction. The antitryptic reaction continues to attract much attention. Eckenstein (*Lancet*, Aug. 6, 1910) has applied the phenomenon of deviation of complement to the diagnosis of hydatid disease. McWeeney, in the same journal, June 18, 1910, gives a most useful account of the precipitin test in medico-legal work, with references to literature.—[G. L. G. and A. G.]

* * * * *

Mental Diseases.—During the past year an encouraging amount of scientific work in psychological medicine has been published, both in this country and abroad ; much of it, however, is of comparatively little interest to the general physician.

Questions of classification are still keenly debated, although Kraepelin's conceptions of manic-depressive insanity and dementia præcox are used by many authors in England and America as if generally accepted.

The significance of the Wassermann reaction is becoming more clearly realized. Wassermann himself, at the International Congress in Berlin, 1910, admitted that in malaria and sleeping-sickness, as well as in syphilis, the reaction was obtained, but he contended that its value in diagnosis was hardly affected by this, as in practice the history of the case generally rendered it easy to distinguish the disease in question. The importance of syphilis in the production of imbecility and idiocy has also been brought out by means of this reaction.

The value of the Ross-Jones proteid reaction with the cerebrospinal fluid has been emphasized, and as this test is much more easy of application than Wassermann's, it is likely to become widely used in clinical work.

Unfortunately, no decided advance in the treatment of mental disorders can be recorded.

Much has been published in support of Freud's psycho-analytic

methods of enquiry and treatment, and no serious criticism of his work has appeared from anyone who has given his methods a fair trial. There are, however, several *à priori* objections to his teachings, and it must be admitted that few physicians are in a position to give to a single patient such an extraordinary amount of personal attention as this line of investigation demands. It is, however, much to be hoped that this promising line of study will be taken up by independent observers.

Articles have appeared on the diagnosis in states of depression, the value of the sinusoidal current in mental disorders, and on the use of specially prepared soured milk in treatment.—[B. P., N. K.]

* * * * *

Nervous Diseases.—A large amount of important work has been done since last year to elucidate the pathology of the group of diseases included under the heading of infantile paralyses. Attention has also been directed to the symptomatology of various diseases, such as caisson disease, tuberculous meningitis in adults, cervical rib, and organic hemiplegia, whilst the therapeutics of tetanus, brachial plexus lesions, neuralgia, etc., are discussed.—[P. S.]

* * * *

Ophthalmology.—In the everyday work of the consulting-room, ophthalmic surgeons are paying a good deal more attention than formerly to the correct centring of the lenses they prescribe, and especially in the case of bifocal glasses. Defects in the muscular co-ordination of the two eyes sometimes produce unpleasant symptoms, and in these cases their correction by appropriate prisms or by the decentring of the spherical element in the correcting lenses has to be undertaken. As a guide what to do in these cases, a little work on the "Prescribing of Spectacles," by Percival, may be recommended.

Two subjects that, during the last few years, have excited much interest in the ophthalmic world, are the technique of cataract operations and the pathology of chronic glaucoma. On the latter subject a good deal of fresh light has been thrown by the anatomical researches of Thomson Henderson, but his conclusions cannot be said to have yet received general acceptance. With regard to the treatment of this condition, we have heard much of late from the advocates of one or another method of sclerectomy with the object of establishing a direct communication between the aqueous chamber and the sub-conjunctival space. Henderson believes all such procedures to be unscientific, in that, if such a communication could be permanently established, there would cease to be any aqueous chamber at all. In his view, if the normal exit by way of the angle of the anterior chamber is blocked, the only alternative way by which an excessive pressure of the intra-ocular fluid can be diminished is by an iridectomy, which brings it into closer contact with the iris veins, which can absorb it. In some cases, however, the good results of operation for sclerectomy

have been proved. Whatever the explanation, several cases have now been shown before critical audiences of ophthalmic surgeons, in which either Herbert's operation or the operation of trephining the sclera has been followed by a decrease in intra-ocular tension, apparently permanent and without any counterbalancing disadvantage. —[A. H. T.]

* * * * *

Syphilis.—The most interesting event in syphilology has been the introduction of the now notorious "No. 606," concerning which the sensational reports appearing in the lay (Continental) journals recall the tuberculin boom of twenty years ago. For some time past Ehrlich has devoted his attention to the production of a drug which will have the immediate effect of destroying all the parasites of protozoal diseases without damaging the tissues of the host: in other words, the attainment of a *therapia magna sterilans*. It is claimed that this object has been achieved by his two latest preparations, arsenophenylglycin and dioxydiamidoarsenobenzol, otherwise known as the Ehrlich-Hata preparation, or "No. 606." Both these drugs are said by Neisser to cure syphilis in apes, as proved by subsequent successful re-inoculation with syphilis, and the Ehrlich-Hata preparation has been found to cure recurrent fever (due to the *Spirochæta obermeieri*) both in animals and in man. The latter drug, "No. 606," is being extensively tried in human syphilis on the Continent, and, judging by the published reports of cases, it appears to have an effect on syphilitic lesions which is described by some writers as dumbfounding, even more rapid and more striking than the best results obtained by mercury or iodides. Further, "606" is said to cure lesions which have long been resistant to the usual methods of treatment. But whether these results are permanent, or whether "606" will prevent the ultimate development of tertiary syphilis, remains to be proved.—[C. F. M.]

* * * * *

Tropical Medicine.—Sleeping sickness is still perhaps the disease which dominates tropical research. Mechanical transmission by glossina, which was advocated for so long, has now been proved to be erroneous, and it is only after a developmental period that the fly is infective. Arsenic or antimony in many forms have not fulfilled the hopes entertained of them, and it is as yet too early to say whether in "606" we have the long-sought-for remedy.

The author has described, under the name of *T. rhodesiense*, a trypanosome in man, causing sleeping sickness, which he believes to be different from *T. gambiense*. It differs in morphology, and it exceeds in virulence any known strain of *T. gambiense*.

The number of trypanosomes described in Africa is now very large, and it will be some years before anything like order is evoked out of the chaos of specific names. A most peculiar and important feature of sleeping sickness is that some twenty cases have been described

from areas where, as far as is known, *Glossina palpalis* does not exist. It is very important to ascertain whether this absence is apparent or real. The source of *T. grayi*, a trypanosome not uncommonly found in tsetse flies, has now been traced to crocodile's blood.

The work of Leishman on the granule stage of spirochætes, if confirmed, opens up new fields of research into the mode of transmission of spirochætes.

Pellagra is a disease that has lately attracted much attention, but it is too early yet to state whether the protozoa theory of its origin has any basis of fact.

Phlebotomus fever has shown us how little we know of the various species of phlebotomus and their habits. Their larvæ, in spite of assiduous search in all manner of places, elude discovery, with the exception of occasional ones found in cracks of walls in Malta.

Recent work on beri-beri again points to rice as the causative agent, and not to any specific organism.—[J. W. W. S.].

ABDOMINAL INJURIES, INTERNAL.

John B. Deaver, M.D., LL.D.
D. B. Pfeiffer, A.B., M.D. } *Philadelphia.*

Battle[1] states that the student should be instructed that in all abdominal injuries it is advisable to follow a certain routine in the examination of the patient—to ascertain when the last meal was taken, when the bladder was emptied, and whether the patient was in good health before the accident; to enquire as to the position and extent of the pain, and then to examine the abdomen carefully for dullness, to see whether this is fixed or movable. By this time he will have found out whether the injury is general or local, and will know the amount of tenderness, its position and extent. He should note also the state of the pulse and the temperature. Further, the patient should be re-examined nearly every hour, and no morphia given, unless it has been decided to operate, when it is permissible.

In rupture of the intestine the cases may be arranged in fairly definite groups according to the symptoms.

In the first of these groups there are shock, vomiting, acute abdominal pain, with great tenderness over the part struck, and board-like rigidity of the abdominal wall. All these symptoms are present, but they vary somewhat in their intensity; at one time shock is the main feature, at another it is the pain, and so on. With these there should be present a certain amount of localized dullness on percussion. About 50 per cent of all cases belong to this group.

In the second group there is no evident shock, and perhaps the patient walks to the hospital, or goes home, congratulating himself that he has had a "narrow escape"! He may have vomited soon after the accident, which made him feel faint, but there are no marks of injury on the abdominal wall, or they are but slight. He has considerable local pain, and there is rigidity of muscle, sometimes confined

to the side of the abdomen which was struck. There is tenderness on pressure, and perhaps localized dullness, but the man feels that he will soon get over it, and probably he remains under treatment with reluctance, or neglects to call in medical advice on his return home. About 40 per cent of the total number of cases belong to this group.

In a third group the symptoms are rather indefinite ; there is a history of abdominal injury, probably of the kind which sometimes produces a rupture of the intestine, but the shock is trifling, there is no vomiting, local pain is slight or absent, there is little tenderness, and no rigidity of muscle, whilst percussion gives no change in note. After a variable time there may be a rising pulse, with that change in facial aspect which indicates to the experienced eye the presence of grave peritoneal inflammation.

Operation is warranted by well-founded suspicion that this accident has occurred.

In St. Thomas's Hospital there have been 31 operations with 10 recoveries, and in other London hospitals which publish reports there are records of 71 operations with 11 recoveries.

Rupture of the spleen, liver, bile-ducts, and urinary bladder are also considered.

REFERENCE.—[1]*Pract.* July, 1910.

ABSCESS, ACUTE. (*See also* BREAST *and* TUBERCULOSIS, SURGICAL.)

Antifermantin, an antitrypsin fluid used with success by MacEwan (*page* 8).

ACANTHOSIS NIGRICANS. *E. Graham Little, M.D., F.R.C.P.*

In last year's *Annual* I referred to two newly-reported cases of acanthosis nigricans, and contributed a coloured plate of a case which had been under my own care. Pollitzer had the privilege of reporting the first case recorded in the literature, under the title, suggested by Unna, of acanthosis nigricans, and has naturally a special interest in this disease. This case occurred in a woman, aged sixty-two, who died, within ten months of the onset of cutaneous manifestations, of an affection diagnosed as abdominal cancer. Pollitzer[1] regards the disease as "a symptom of a disorder of the abdominal sympathetic." The skin manifestations comprise widespread pigmentation and papillary hypertrophy, associated with papillary hypertrophy affecting mucous membranes. The sites of election for the eruption are, in order of frequency, the axillæ, neck, genitals, groin, face, thighs, elbows, knees, umbilical region, peri-anal region, back of hands, breasts, gluteal region, hypogastrium, forearm, perineum, and eyelids. Two forms of acanthosis nigricans may be distinguished clinically : the juvenile (occurring in persons under twenty), in whom malignant disease is not usually a sequence ; and the older cases, of which thirty-five are on record, of whom twenty-two certainly or probably died of cancer. In one juvenile case, a woman, aged nineteen, with typical cutaneous symptoms, an operation for the removal of a chorio-epithe-

lioma of the uterus resulted in a dispersal of the skin eruption and the recovery of the patient.

In a case under Norman Walker,[2] in a woman aged twenty-nine, the symptoms had begun eight years previously, with hardening of the palms and soles, followed by slight brownish pigmentation. There was comparatively little papillary hypertrophy. About a year ago the patient began to have attacks of vomiting and abdominal pain, but tests for free hydrochloric acid did not justify the diagnosis of carcinoma. Treatment was as follows: Starch poultice, salicylic-creosote plaster; and salicylic soap plaster, and lastly, 10 per cent salicylic collodion were used for the hardened hands and feet; borocalamine lotion for the other parts. Adrenalin chloride was tried internally, but did not seem to have any effect.

[*Plate XIII* is from a case which occurred in the Exeter Hospital, the photograph of which I owe to the kindness of Mr. Kellock,]

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Oct. 23, 1909; [2]*Brit. Med. Jour.* Nov. 27, 1909.

ACARO-DERMATITIS URTICARIOIDES.

E. Graham Little, M.D., F.R.C.P.

Schamberg[1] gives an extremely interesting account of an epidemic eruption of the skin, which was noted in Philadelphia as occurring in a large number of persons who had slept on certain new straw-mattresses supplied by four leading mattress makers, the component straw being obtained from a single dealer in New Jersey. The straw was sifted through a fine flour-sieve on to white paper, and a parasite was detected, which was identified by an entomological expert as a species of *Pediculoides ventricosus*. Lesions of the disease were produced experimentally by contact of the bared arm for an hour with the incriminated mattress. Some of this straw was sifted into two clean Petri dishes; the contents of one was applied for an hour to the axilla of an experimenter, with the production of the eruption; the contents of the second dish were treated with chloroform vapour, which killed the parasites, and the straw was applied to the axilla without producing any effect. The eruption consisted of: (1) Wheals topped by minute vesicles, which speedily became purulent; (2) Varicella-like lesions; and (3) Maculo-erythematous lesions like erythema multiforme. The appearance of the eruption was usually within sixteen hours of the infection, and was seen chiefly on the neck, chest, abdomen, and back: the hands, feet, and face being as a rule exempt. Blood examinations showed a moderate leucocytosis, with well-marked eosinophilia; there was albuminuria in three out of twenty cases. The parasite does not burrow, like the *Acarus scabiei*, and is therefore more readily destroyed. The following ointment was found very efficacious:—

℞	Beta-Naphthol.	gr. xxx	Adip. Benz.	℥j
	Sulph. Præcip.	gr. xl		

The clothing required disinfection, and the mattresses were freed

PLATE XIII.

ACANTHOSIS NIGRICANS.

E. Graham Little, M.D.

from the parasite by exposing the straw to steam, sulphur vapour, or formaldehyde in a closed vessel.

Wheat, barley, and other grains have given rise to similar eruptions. The parasite is many times smaller than the *Pediculus pubis*. The female when pregnant develops an enormous sac at her posterior end —from twenty to a hundred times the size of the rest of her body— hence the appellation " ventricosus."

REFERENCE.—[1]*Jour. Cutan. Dis.* Feb. 1910, p. 67.

ACHYLIA GASTRICA.

(*Vol.* 1910, *p.* 567)—This condition, a total failure of gastric secretion, may be functional or symptomatic of some organic disease. **Diet** is important; animal food should be tender, and either well chewed or minced, while vegetables should be passed through the sieve. **Hydrochloric Acid** (1 dr. of the dilute acid) after meals is useful. **Pepsin** or **Pancreatic** preparations may be given with advantage. **Nux Vomica** and **Condurango** are good tonics. **Lavage** is useful for the relief of fermentation.

ACNE PUSTULOSA. *E. Graham Little, M.D., F.R.C.P.*

Lassueur[1] reports a series of cases which he treated with injections of acne and staphylococcic **Vaccine** obtained from the Inoculation Department of St. Mary's Hospital. He summarizes his results as follows: In nine cases of acne pustulosa with comedones, there was a very manifest improvement in the pustulation, and a less obvious but still definite improvement as regards comedo-formation. In eight cases little effect was obtained; in three there was aggravation of suppuration, explained by the author as probably due to too frequent injections. In two cases of acne, uncomplicated by suppuration, there was great improvement, which was maintained three months after, when this paper was written.

REFERENCE.—[1]*Ann. de Derm. et de Syph.* July, 1910, p. 377.

ADDER BITE. *Robt. Hutchison, M.D.*

Three cases in this country have recently been described,[1] one in a boy of fourteen, the other two in adult males. The symptoms set in rapidly after the bite, and consisted in (1) General collapse, with feeble pulse, coldness of the extremities, and clammy sweats; (2) Local œdema in the neighbourhood of the bite, attended by a bluish-red discoloration of the parts; (3, the worst) Vomiting, diarrhœa, and strangury, with swelling of the lips, tongue, and fauces.

The TREATMENT consisted in the use of **Stimulants** (brandy, digitalin, strophanthus, sal volatile), with heat to the surface; the application of a **Bier's Bandage** above the level of the bite, with incisions and antiseptic dressings locally; and in one case the injection of 25 cc. of **Anti-venom Serum** (B. W. & Co.) into the flank. All the patients recovered. The reporter of the case in which the serum was used is uncertain to what extent it was beneficial, but he is convinced of the value of applying a Bier's bandage.

REFERENCES.—[1]Edleston, *Brit. Med. Jour.* Sept. 11, 1909; Orton, *ibid.*; Sapwell, *Lancet*, Oct. 23, 1909.

ADENOID VEGETATIONS. (*See* NOSE, DISEASES OF.)

ALBUMINURIA. *Francis D. Boyd, M.D.*

Teissier,[1] in a clinical lecture, discusses what he terms pretuberculous albuminuria and paratuberculous albuminuria.

Pretuberculous Albuminuria.—By this is meant an albuminuria preceding, announcing, or even preparing the way for the evolution of a localized tuberculosis, most frequently of the lungs, but possibly in some other organ, such as the suprarenals. In this type of albuminuria the patient is usually a young person, and complains of indefinite lassitude and malaise. Albumin in small quantities is found in the urine, but it is intermittent, of diurnal cycle, and is accompanied by phosphaturia. Examination of the lungs at this time shows an absence of physical signs of disease; but later, say in six months, signs of congestion at one apex may develop, coincident with a disappearance of the albuminuria. Improvement of the lung condition may occur, and the patient has a period of health marked by occasional recurrence of albuminuria. With periods of intermission this albuminuria recurs, ultimately to disappear completely on the incidence of a definite pulmonary lesion from which the patient succumbs in a few months. During the whole of the fatal illness albuminuria is absent. The author has seen some twenty cases of this type of albuminuria. Tubercle bacilli are never discovered in the albuminous urine, and no positive result was obtained on injecting into animals the centrifuged deposit of the urine. Pretuberculous albuminuria the author considers toxic in origin, and the result of bacteriolysis, more or less complete, of the infecting pathogenic elements. The products of the disintegrated tubercle bacilli acting as irritants of the kidney during their excretion, produce the albuminuria, but when the agents of bacteriolysis become unable to cope with the bacilli, then the bacilli find themselves in the tissues, and a miliary tuberculosis results. Toxic elimination by the kidney now diminishes, and albuminuria disappears. At the same time the depressive reactions of the organism disappear—the serum reaction becomes negative. The author admits that his theory of the disease picture is hypothetical, but it is supported by the fact that in several cases when the serum reaction again became positive, the pulmonary condition improved and albuminuria reappeared.

The albuminuria of the pretuberculous type has certain characteristics. The urinary quantity is never very abundant; the colour and aspect of the urine are uniform when the albuminuria is constant, but the colour is very unequal when the albuminuria is intermittent — pale in the morning, dark in the afternoon—the albuminuria corresponding with the period of pallor. The deposit consists of mucus, phosphates, and oxalates. The albuminous body is most frequently a sero-globulin, but a pure globulinuria may occur. Albumin elimination may be inconstant, and is most frequently intermittent; but at other times it assumes a cyclic form—most frequently a morning cycle—or it may be of the orthostatic variety, with this difference, that the maximum excretion is at about 11 a.m., and not shortly after rising in the morn-

ing. Whatever be the type of the albuminuria, the kidney is always permeable and the total of the molecular diuresis is high. The urine is always hypertoxic. Tube-casts are absent, there are few leucocytes, and never red blood-corpuscles. At this time serum diagnosis is negative. The arterial pressure is normal. When the pulmonary phenomena appear, the radial pressure falls. Disappearance of the albuminuria marks the appearance of the pulmonary phenomena, which may be of an acute or of a chronic type. Pretuberculous albuminuria may be easily mistaken for an ordinary functional albuminuria.

Paratuberculous Albuminuria. — In the case of young persons suffering from intermittent albuminuria there is frequently a family history of tubercle, but in few instances do the individuals themselves show any tuberculous lesion. In these cases the urinary phenomena are distinctive. The total molecular diuresis is below the normal and the co-efficient shows renal impermeability. The arterial pressure is raised, never below the normal. The serum reaction is very positive, and bears witness to the tuberculous intoxication. These individuals impregnated with inherited toxins and antitoxins have a tendency to kidney weakness which shows itself either in outbursts of a mild latent nephritis which does not develop fully, but renders the kidney fragile, or in attacks of transient albuminuria. In illustration, the history of a family is given: the grandfather, tuberculous but cured; four children, all showing stigmata of tuberculosis; four grandchildren, showing transient albuminuria of the paratuberculous type. These children should not become tuberculous; they have inherited an immunity.

These two types of albuminuria are distinct in their characters and in their significance. They are easily differentiated, thanks to the essential differences in the urinary findings, the difference in blood-pressure, the absence of sero-reaction in the subjects of the one form with the extreme agglutination in the others. Their evolution also differs; the one leads to tuberculosis, the other results from tuberculosis, getting more and more distant in successive generations till it leads to spontaneous immunization.

Family Albuminuria.—An interesting case of "family albuminuria" is recorded by Fergusson[2]. The patient, born in 1861, contracted remittent fever in Central America in 1886. He returned home and consulted a physician, who, finding albumin present in the urine in considerable quantity, gave a bad prognosis. The patient's general health, however, remained good, and he accordingly returned to work. Since that time the urine, frequently examined, always contained albumin in considerable amount (3 grams per litre). The urinary quantity was about normal, the specific gravity 1022. The albumin on examination proved to be of the nature of serum albumin. Microscopic examination failed to show any tube casts. The circulatory system was unaffected. A remarkable feature in the case was disclosed by the history. The patient's father and mother both suffered

from albuminuria: the father slightly, the mother severely. Of five daughters, three suffered from severe, and two from slight, albuminuria. Two sons, one the patient, both suffered from severe albuminuria.

Albumosuria.—Primary and secondary albumoses are described; but clinically, when they appear in the urine they seem to have the same significance, representing as they do the earlier stages of disintegration of proteins by hydration, the end-products of which are xanthin bases, uric acid and urea. Normally, those end-products are reached before the bodies are excreted by the urinary apparatus, but when tissue disintegration reaches a certain point, this change can no longer be accomplished: albumoses pass into the blood and are excreted by the kidneys.

Permanent abundant albumosuria of the Bence-Jones type is regarded as almost pathognomonic of multiple myelomata. Albumosuria of the ordinary type has been found chiefly in suppurative processes in which pus is retained and disintegrated, in acute infectious disease, and in acute inflammations; in particular, in pneumonia, empyema, and large abscess. Henderson[3] holds that albumosuria is much more frequent than is generally supposed, and that it should occupy a more prominent position in clinical work as an aid to diagnosis and as of value in prognosis. The biuret test is the best for the recognition of albumose. All albumin must be removed by precipitation with an equal volume of trichloracetic acid and heat. The filtrate is then subjected to the biuret test. The reagent consists of a 20 per cent solution of caustic alkali in distilled water, to which sufficient copper sulphate has been added to give it a faint blue tint. The urine is floated on the surface of this solution, and a rose-pink colour at the junction of the fluids indicates the presence of albumose. The author, from his observation of 78 cases of pneumonia, concludes (1) That in view of the higher mortality-rate, the presence of albumose must be regarded as an unfavourable indication; (2) That persistent albumosuria suggests the possibility of complications, especially empyema; (3) Generally albumosuria suggests greater severity of the disease, though it may be absent in severe cases; (4) The presence of albumosuria does not, as has been suggested, furnish a reliable index of the extent of lung tissue involved in pneumonia. Upwards of eighty cases of nephritis were examined for the presence of albumosuria, and of this series the only fatal case which never showed albumose was one of chronic interstitial nephritis with a double aortic lesion. The conclusions are that (1) In acute and subacute nephritis albumosuria is rarely present—when present it may be associated with uræmia, and indeed may herald its onset; (2) Albumosuria is most constantly present in chronic parenchymatous nephritis; (3) The presence of albumosuria is often in such cases associated with, though it does not necessarily indicate, a fatal issue.]

References.—[1]*Sem. Méd.* No. 48, 1909; [2]*Brit. Med. Jour.* Mar. 1910; [3]*Jour. Clin. Research,* June, 1910.

ALCOHOLISM.

(*Vol.* 1910, *p.* 385)—J. S. Bolton recommends **Apomorphine** (5 min. injected hypodermically with the patient lying down) for the acute stage. This can be repeated if necessary. After slight vomiting sleep will follow. When the acute stage is over, the patient should visit the doctor two or three times daily, for injections of liq. atropinæ sulphatis 1 min., with liq. strychninæ hydrochlor. 4 min., into the biceps muscle at each visit. These injections should be given at least twice a day for two to four weeks, then daily for two or three weeks, after which the frequency of the dose should be gradually reduced. By this means, with administration of a pick-me-up (such as tinct. capsici 1 min. with ext. cinchonæ liq. 15 min), and attention to general health, the craving may be destroyed. The patient should afterwards remain under supervision, being warned against the danger of relapse.

ALOPECIA AREATA. *E. Graham Little, M.D., F.R.C.P.*

Jackson[1] claims to have had good results in the treatment of alopecia areata by exposure of the patches to the rays of the Piffard iron **Spark-gap Lamp,** the quartz lens being removed, and the lamp held over the part to be treated, and far enough from it to prevent sparking, for five to ten minutes. The sittings were repeated every two to four days, and about seventeen or twenty exposures seemed efficacious.

Reference.—[1]*Jour. Cutan. Dis.* Jan. 1910, p. 18.

AMAAS. *E. W. Goodall, M.D.*

A brief, but clear and informing account of this disease has recently been supplied by J. P. Grant.[1] There has in past years been some controversy as to its nature, whether it was or was not small-pox ; but Grant's account leaves it without doubt that amaas is nothing but small-pox of a mild type, such as has been for the last few years prevalent in other parts of the world. Though on the whole a mild affection, fatal cases of it are occasionally met with. Grant writes that " with regard to the origin of the name, there are two opinions, viz., that the Kaffirs, realizing that the pus in the pocks was thick and white, gave it their name for soured milk—' amaas.' The other opinion is, that the natives, fearful of quarantine, generally attempt to hide the disease, and insist on calling it measles, or as they call it ' imasisi.' "

Reference.—[1]*S. Afr. Med. Rec.* Jan. 8, 1910.

AMAKEBE. (*See* Piroplasmosis.)

AMENORRHŒA.

Amenyl (methylhydrastinimide) in (*page* 6) ; **Eumenol** in (*page* 29).

AMŒBIASIS. *J. W. W. Stephens, M.D.*

S. K. Simon[1] draws special attention to the fact that the symptoms are not always clearly defined and constant, but that there are quiescent periods in which there may even be obstinate constipation or normal stools alternating with attacks of diarrhœa. The diarrhœa and character of the evacuations depend on the location of the ulcers. is in the rectum, there is usually marked tenesmus ; but if the lesions are above the sigmoid, as they most frequently are, the stools may not exceed two to three a day. The amount of blood-stained mucus If usually small. The author has used **Ipecacuanha** for two years, and is now a firm believer in its efficacy, and believes that its want of success

in other hands is due to incorrect methods of use. Absolute **Rest in Bed** with restricted diet is particularly essential. **Castor-oil** is given as an initial purgative, and then each evening after a three hours' fast, 40 to 60 gr. of ipecacuanha in pill form coated with phenyl salicylate (**Salol**). The dose is then reduced 5 gr. each evening until 10 gr. is reached. The 10 gr. are then continued each day for two weeks. Irrigation with saline solution may be used at the same time when the dose of ipecacuanha is reduced to 10 gr. Before using ipecacuanha, irrigation was found inefficacious.

A. B. Herrick[2] advocates the treatment of very severe and late cases of amœbic dysentery by the operation of **Cæcostomy** in preference to appendicostomy, as by the former operation complete rest of the large bowel is obtained, a necessity in the most severe forms of dysentery. The operation is simple. An incision three inches long is made into the abdominal cavity over the cæcum. The cæcum is drawn into the wound, and a longitudinal band is fastened to each side of the incision by a running catgut suture. The protruding pouch of cæcum is fastened to the skin by a few interrupted catgut sutures, iodoform packing being introduced between in order to drain and to shut off contamination of the muscle layers. The cæcal pouch is opened at once, the contents are sponged out, and irrigation can be commenced immediately. In very severe cases local anæsthesia only was used. The patients treated in this way became well and strong, although the large bowel had been side-tracked. The closure of the wound is also very simple. The mucous membrane is united, and then turned in by an interrupted suture approximating the serosa.

W. E. Deeks[3] enumerates the following as the symptoms upon which a diagnosis of amœbic dysentery was based: Frequent dysenteric stools, with or without tenesmus, a coated furred tongue, more or less irregular fever, prostration and distress, with large motile amœbæ, blood, pus, epithelium, and mucus in the stools. Abdominal tenderness is most frequent over the cæcum and sigmoid flexure. A characteristic symptom, but one not confined to this disease, is loss of elasticity of the skin of the abdomen, which, when pinched up, only slowly returns to its normal position. The more marked this condition, the graver the disease.

The treatment adopted may be termed the rest-supportive treatment: absolute **Rest,** absolute **Milk Diet** but plenty of it, saline or water **Irrigations,** and **Bismuth Subnitrate** in heroic doses. Morphine and atropine may be given if tenesmus is very severe, but it is not considered good as a routine measure. Of the bismuth subnitrate 1 dr. or 1½ dr. by measurement (3 dr. by weight) stirred in a glass of water, are given every three hours until there is a general improvement, which takes place in three to ten, or at most fifteen, days. On the Canal Zone of Panama this treatment has given by far the best results. If improvement does not rapidly follow, surgical interference is called for.

J. M. Anders and W. L. Rodman[4] advocate **Appendicostomy** in cases that resist treatment. They consider that ipecacuanha in

general, but not invariably, exerts a markedly beneficial action. Salol-coated pills are recognized as being a great advance in the method of administration. Not less than 30 gr. in a dose are given on the first day. The patient should fast four hours beforehand, and keep quiet for a like period after. The amount is then diminished by 5 gr. daily, so that on the sixth day only 5 gr. are being given. During the next week or ten days a nightly dose of 5 gr. is given. With regard to irrigation by solutions of **Quinine** 1–5000 at body temperature, certain details are necessary to ensure success, e.g., marked elevation of the hips, the insertion of a soft rectal tube three to four feet into the colon, and the retention of the fluid for fifteen to twenty minutes. The irrigations should be maintained until amœbæ disappear from the stool. But in certain cases rectal injections are not successful; in such the authors recommend **Appendicostomy**. The incision made is the gridiron or McBurney incision. The operation should be done in two stages. It is best to bring the base of the appendix well up against the abdominal wall, stitching the meso-appendix to the parietal peritoneum. The vitality of the appendix is thereby ensured, and intestinal obstruction, which is possible when the cæcum is suspended by the appendix, as generally done, is avoided. By this method the appendix is found to be of normal colour at the end of forty-eight hours, and not gangrenous as when the meso-appendix is ligatured. The appendix is brushed with cocaine and cut off. A No. 10 rubber catheter is introduced into the cæcum and irrigation carried out. The authors prefer this operation to cæcostomy on account of the difficulty of preventing leakage in the latter.

A. B. Cooke[5] holds that the only reliable method of obtaining a specimen for microscopic examination for amœbæ is by passing a proctoscope and observing the ulcer, and slowly curetting to obtain material. The amount of leucocytosis is also an aid to diagnosis, as it is proportionate to the degree of inflammation and the amount of tissue destruction. The author does not advocate drug treatment as a routine method. Of the intestinal antiseptics, **Salicylate of Bismuth** has proved to be the most reliable. Tenesmus is one of the symptoms that demands combating. It is an indication of rectal disease, and it is here that local treatment is particularly justifiable. A proctoscope is passed, the mucosa is carefully cleansed, and the ulcer touched with a solution of nitrate of silver 60 to 120 gr. to the ounce. A general application is also made at the same time of a solution of silver nitrate, 3 to 5 gr. to the ounce, by means of an atomizer. The treatment is repeated daily until the tenesmus is controlled. The ulcers heal rapidly. With regard to irrigation, the patient is placed in the knee-chest or inverted posture, and a six-inch proctoscope is passed. The tube can then be passed well into the sigmoid, and the proctoscope withdrawn. At least half a gallon of solution (e.g., saline) should be used once or twice a day. In cases where surgical interference is necessary, **Appendicostomy** is favoured, but the operation should not be delayed until the patient is moribund.

W. Allen[6] holds with Musgrave and Clegg, in opposition to Schaudinn, that all amœbæ constantly found in the stools are pathogenic, and that everyone who constantly carries amœbæ will sooner or later show signs of amœbiasis. The author emphasizes the fact that sixteen out of forty-two cases gave no history of frequency of bowel movement. The author holds also that over 50 per cent of uncomplicated cases will show a moderate eosinophilia (5 per cent). In nineteen out of thirty-five cases *Trichomonas vaginalis* (sp. ?) was present. The author found that ipecacuanha did not seem to influence the course of the disease, and he considers that medical treatment is radically wrong, for he does not believe that any of his cases have been permanently cured.

References.—[1]*Jour. Amer. Med. Assoc.* Nov. 6, 1909; [2]*Med. Rec.* Nov. 13, 1909; [3]*Ibid.*; [4]*Jour. Amer. Med. Assoc.* Feb. 12, 1910; [5]*Ibid.* Feb. 19, 1910; [6]*Med. Rec.* June 25, 1910.

AMPUTATION. *Priestley Leech, M.D., F.R.C.S.*

Stumps.—Moschcowitz,[1] of New York, draws attention to some of the fallacies as regards amputation stumps. It has been generally taught that the cicatrix of the stump should not lie over the end; but he has found that the tenderness of the stump has no relation to the site of the cicatrix, which in the majority of cases is anæsthetic; this does not, of course, refer to cases where a sensory nerve has been included in the cicatrix. Another time-honoured tenet which has no foundation is that, wherever possible, the stump should be covered with skin that is normally subject to pressure. One of the cardinal rules has been that a stump should be well covered by a mass of muscle; but on examination, Moschcowitz says that such stumps will be found to be quite as tender as those that are practically covered by skin alone. The advocates of this procedure also forget that ultimately the muscles atrophy, and the end of the stump is just as if no muscle pad had been placed over it. Only a small minority of painful stumps are due to the inclusion of nerves; and in his opinion the cause of painful stumps in the majority of cases is due to the bone and periosteum. In amputation stumps, pressure is applied either upon a sawn surface of bone, bone not covered by periosteum, or bone covered by inflamed and proliferating periosteum; to obviate this, Bier devised his osteoplastic method of amputation, and this is the reason why the Pirogoff, Stokes-Gritti, Sabanajeff, Abrashanoff and Bier's amputations leave painless stumps.

In cases of amputation for Raynaud's disease (or as Dr. Leo Buerger has termed it, thrombo-angeitis obliterans), the following is a good test as to where to amputate. A Martin's elastic bandage is applied high up on the extremity—sufficiently high to cause an anæmia; it is allowed to stay in situ a few minutes, and is then unrolled. The extremity is then carefully inspected in order to note the lower border of the area of primary reactive hyperæmia. This is the line where amputation is to be done.

Shoulder.—Lockwood[2] reports three cases of Berger's interscapulo-thoracic amputation, with recovery. There was very little shock, and

this was attributed to the small amount of blood lost, owing to the preliminary ligation of vessels, and careful clipping of all vessels and bleeding points as soon as cut. One was operated on for carcinoma following breast cancer, and the other two for sarcoma and chondrosarcoma. The two latter died from early recurrence; and Lockwood believes that chondrosarcoma is a much more malignant disease than is usually thought.

Knaggs[3] draws attention to Littlewood's method of performing this amputation, and as it may not be well known, it is here described. The vessels are tied last, and not at the beginning of the operation. The usual skin incisions are made, and the clavicle is divided; then the operator, standing behind the patient, reflects the posterior flap sufficiently to expose the muscles inserted into the posterior border of the scapula; these muscles are raised upon the finger and divided with scissors, and near the upper angle the posterior scapular artery is clipped and divided. The scapula is dragged away from the thorax by an assistant, who holds the arm; the trapezius is put on the stretch and divided; the omohyoid is cut, and the suprascapular vessels are secured as they run into the notch. The large vessels and nerves are now seen standing out; the nerves are divided, then the artery, and lastly the vein, the latter between two pairs of forceps. A few cuts of the knife divide the pectorals, the latissimus dorsi, and serratus magnus. The advantages of this method are that less blood is lost and less time is occupied.

REFERENCES.—[1]*Med. Rec.* Dec. 18, 1909; [2]*Lancet*, Ap. 30, 1910; [3]*Ibid.* May 7, 1910.

ANÆMIA, APLASTIC. *George Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Cases have been recorded by Thiele.[1] They were strong male subjects. Gastro-intestinal symptoms were prominent. There was pyorrhœa. The blood showed great anæmia, no megalocytosis, and no nucleated red cells. The colour-index was low. The white cells were greatly diminished, and there was relative lymphocytosis. The organs were fatty. In one case there was excess of iron in the liver, spleen, and kidneys. In another there was not.

Carslaw and Dunn[2] gave a careful pathological report of a case and a résumé of literature. They suggest that aplastic anæmia is not a single definite disease, and that anæmia with aplastic marrow may be the result of a number of etiological factors. The failure of the regenerative functions would appear to depend in most cases on excessive action of the toxin; in some, perhaps, it may be associated with an individual susceptibility.

REFERENCES.—[1]*Lancet*, Ap. 2, 1910; [2]*Glasg. Med. Jour.* May, 1910.

ANÆMIA, PERNICIOUS. (*See also* LEUCOCYTHÆMIA.) *George Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Gillman Moorhead[1] calls attention to pigmentation of the buccal mucosa as a rare symptom in this disease.

Spinal Lesions.—Hale White and Byrom Bramwell[2] report cases of spinal sclerosis associated with pernicious anæmia. In Hale White's case the first diagnosis was anorexia nervosa. Babinski's sign was found, and led to a subsequent examination of the blood. Bramwell's case was one of long-standing combined degeneration of the cord, followed by a rapidly fatal development of pernicious anæmia.

Camac and Milne[3] also report two cases. In one there was the usual combined sclerosis of the white matter; in the other the grey matter was also affected.

Course and Duration.—Parkinson[4] records a case, probably unique, in which, after an ordinary course for about six months, the patient suddenly developed acute symptoms of diabetes and died in fifteen days.

Rudolph and Cole[5] also report a case of twenty years' duration. Symptoms began at the age of eight, and there was a remission till the age of twenty-eight. Symptoms had again moderated at the time of publication. The only unusual feature was a greatly enlarged spleen.

McPhedran[6] records a case with a remission for seventeen years. He points out that the outlook in any case is not necessarily unfavourable for the immediate future. Temporary improvement is the rule, but few live beyond three or four years.

Treatment.—Most of the reports indicate that **Arsenic** holds its position as the drug chiefly given in this condition. Rudisch[7] has found marked improvement following large doses of **Hydrochloric Acid.** There is diminution of HCl and pepsin in the gastric juice, and the deficiency of acid leads to diminished output of secretion and consequent diminution of pancreatic juice. Rudisch gave 30 gr. of pepsin and 105 minims of dilute HCl thrice daily. The latter was given in 15-min. doses in albumen-water every ten minutes. The fact that the acid was combined disguised its taste without affecting its action.

Croftan[8] regards the *gastric insufficiency* as a very important element, and has had much improved results since initiating treatment in this direction. It consists in the incorporation of the maximal amount of proteins administered with artificial digestants to facilitate their assimilation in the gastro-intestinal tract and their proper absorption from the bowel. The diet consists in an abundance of meat, fish, eggs, milk, and buttermilk, administered by mouth in a finely divided form, in comparatively small quantities at frequent intervals; so that the patients, instead of receiving three large meals a day, receive five or six smaller feedings in the course of the twenty-four hours. The selection of the particular kind of albuminous food and its mode of preparation depend somewhat on individual peculiarities that must be studied in each case. Meats are given in the form of broiled, roast, and stewed preparations—never fried; or as meat juices, raw or slightly heated meat jellies, "peptones," gelatins; eggs, preferably raw or soft boiled, in large quantities each day, a dozen if possible; milk and milk preparations of all kinds *ad libitum.* The addition of

a little alcohol each day to the diet has been found of value rather on account of the food value and the "sparing" properties of the latter than on account of any stomachic or generally stimulating effect. Fats are given moderately, because, when administered in combination with abundant albumins, they are apt to coat the albuminous particles in the stomach and prevent contact with the artificial digestive juices to be administered. Enough cereals, bread stuffs, vegetables, and fruits, all administered in a soft and finely divided form, are allowed in addition, to make up a palatable meal.

Patients are given 10 to 15 drops of strong hydrochloric acid fifteen minutes after each feeding, and again thirty minutes after each meal. It is useless to administer the dilute acid. In order to prevent mouth irritation, the acid is given in mucilage-water. The simultaneous administration of pepsin is unnecessary. Three to five grains of thyroid extract are given thrice daily, with the idea of aiding protein assimilation. A little arsenic may be given as a harmless concession to usage, but no particular benefit follows its use alone.

Huber[9] found that benefit followed the use of **Defibrinated Blood.** Blood is withdrawn by means of a trocar from the vein of a healthy person. It is defibrinated with a glass rod, allowed to stand half an hour, and then filtered. This defibrinated blood is injected deeply into the gluteal region in doses of 10 to 20 cc. once or twice a week. The injection had a beneficial influence even in the most severe cases, and in several instances prolonged life for months.

REFERENCES.—[1]*Brit. Med. Jour.* Ap. 9, 1910; [2]*Ibid.* June 11, 1910; [3]*Amer. Jour. Med. Sci.* Oct. 1910; [4]*Lancet*, Aug. 20, 1910; [5]*Amer. Jour. Med. Sci.* Oct. 1910; [6]*Ibid.* Aug. 1910; [7]*Med. Rec.* Mar. 5, 1910; [8]*Jour. Amer. Med. Assoc.* Aug. 13, 1910; [9]*Deut. med. Woch.* June 9, 1910.

ANÆSTHESIA.

C. A. Leedham-Green, M.D., F.R.C.S.

Venous Congestion in Anæsthesia. — Amongst the numerous suggestions, many of which prove futile, that have been put forward of recent years to diminish the dangers, both immediate and remote, of a general anæsthetic, that advocated by Klapp[1] is worthy of attention. Starting with the assumption that the more blood there is in circulation the greater will be the amount of anæsthetic required to obtain the concentration requisite to inhibit the nerve centres, and the longer the time taken to eliminate it after the completion of the operation, he aims at protecting a considerable quantity of the patient's blood from the effects of the anæsthetic. His method of procedure is as follows: At the beginning of the anæsthesia a broad elastic tourniquet is applied to the upper part of the thighs sufficiently tightly to compress the veins but not the arteries, so as to produce a considerable venous congestion of the limbs. When this has been effected, the elastic bandage is tightened till the arteries also are compressed. By this means a large quantity of the blood is temporarily withdrawn from the circulation and, in consequence, from the action of the anæsthetic. At the completion of operation, or earlier should any difficulty arise with the anæsthetic, the tourniquets are removed,

and a flood of blood, unimpregnated with the narcotic, pours into the general circulation to hasten the rapid elimination of the drug.

The following advantages are claimed for the method: (1) The amount of the anæsthetic required (chloroform or ether) is materially diminished (from $\frac{1}{3}$ to $\frac{1}{2}$); (2) Anæsthesia is more quickly obtained; (3) The return to consciousness is more rapid; (4) The injurious effects which both chloroform and ether have upon the cells of the brain, kidney, liver, and other vital organs, are diminished, and consequently the dangers, both immediate and remote, of a general anæsthetic administration. All those who have made use of this method speak highly of it, and my own experience corroborates its claims.

Intravenous Injections. — With a view to avoiding some of the dangers of inhalation narcosis, more especially that of the irritation of the respiratory passages, Prof. Burkhardt[2] has recently advocated and practised the administration of both chloroform and ether direct into the venous circulation. Finding that the intravenous injection of a saturated solution of chloroform in normal saline fluid easily enabled him to anæsthetize animals, he, with some boldness, tried the method on four patients. The anæsthesia was easily and readily maintained, but in two of the cases a temporary hæmoglobinuria appeared. Burkhardt then experimented in a similar way with ether, again using a saturated solution (10 per cent). This proved to be unsatisfactory, as in several cases it caused the death of the animal from severe hæmoglobinuria and thrombosis. Further experiment, however, showed that a 5 per cent solution of ether in saline solution was tolerated by animals without any injurious effect, and it was administered to some thirty-three patients.

The technique is of the simplest, being merely that of an ordinary venous transfusion, save that to the warm saline fluid 5 per cent of pure ether is added and the fluid shaken until the ether is dissolved. The narcosis gradually develops as the fluid runs into the veins. As soon as the patient is completely anæsthetized, the flow of the fluid is arrested until signs of awaking begin to appear, when more of the fluid is given. Apparently by this means it is not difficult to maintain the anæsthetic state. The amount of fluid required to induce anæsthesia naturally varies according to the size, etc., of the individual. The average amount for a man is about 500 cc. = 25 cc. of pure ether. The total amount of fluid used during the operation varies in man from 850 to 2500 cc. In almost all the cases Burkhardt gave a preliminary injection of scopolamine and morphia. All the thirty-three cases did well, and in none of them was the slightest abnormal change detected in the blood-vessels or the urine. According to Burkhardt, this intravenous administration of ether is, at any rate in strong adults, "the safest and pleasantest method of general anæsthesia;" and he regards it as especially indicated (1) In patients whose respiratory and circulatory organs are weak, (2) In operations on the head and neck, on account of its convenience, and (3) In patients with a marked idiosyncrasy, or with a violent antipathy to inhalation anæsthesia.

Burkhardt's communication aroused considerable interest, more especially amongst the experimental physiologists; but there has been a very natural reluctance on the part of the surgeons to try the method on actual patients, and, so far as I am aware, only Giani,[3] an assistant of Prof. Durante, has done so, with a record of two successful cases. Jenssen,[4] Küttner,[5] Clairmont and Denk[6] all utter warnings of the danger of the method, and report some fatalities from hæmoglobinuria and embolism in the animals upon which they have experimented. Everyone will cordially recognize the value of the research, but at present it seems hardly justifiable to put into surgical practice a method of anæsthesia upon which so little experimental work has been done.

Local Anæsthesia of Limbs. — In April, 1908, Prof. Bier[7] read a paper at the German Surgical Congress, describing a method which he had devised for producing local anæsthesia of the limbs. The method depends upon the introduction of an anæsthetic fluid into one of the superficial veins of the limb. The technique is as follows: The skin is prepared in the usual manner; a sterilized Esmarch's bandage is then wound firmly round the limb, from the periphery upwards, as high as the upper limit of the operation area. Above this, and in contact with its last turn, is placed another rubber bandage sufficiently tight to check the arterial circulation. The bandage covering the distal part of the limb is now removed, and a third bandage is wound firmly round the extremity at the lower limit of the operation area. This bandage must be tight enough to prevent diffusion of the injected fluid into the distal part of the limb. After a preliminary skin infiltration an incision, a couple of inches in length, is made across the line of the vein chosen in the leg, usually the internal saphenous. This vein is isolated and a cannula tied into it firmly, as for an intravenous infusion. The cannula should be directed centripetally if the vein be opened low down in the operation area, centrifugally if opened high up. Any small vessels that may have been divided are now secured to prevent leakage, and a good syringe of about 100 cc. capacity is attached by a short piece of stout pressure tubing to the cannula. The fluid is then injected gradually, a varying but considerable amount of pressure being required. As infiltration occurs, the area swells and turns dusky white in colour. Complete anæsthesia of the isolated area appears in from five to fifteen minutes from the commencement of the injection. It may be accelerated by gentle massage of the part to facilitate diffusion of the fluid, or, if necessary, by the injection of more fluid. When anæsthesia is complete, the cannula is removed and the vein is tied off. The injection fluid must not escape. The skin incision, unless it falls into line with the operation incision, is sutured, and operative measures are then proceeded with.

This anæsthesia of the infiltrated area Bier terms "direct anæsthesia." After from fifteen to thirty minutes, however, from the time of injection, the rest of the limb below the isolated area also becomes anæsthetic. This he terms "indirect anæsthesia." It is due to the establishment

of a "block" in the nerve trunks as they pass through the infiltrated area. Indirect anæsthesia, however, seems to be of limited practical value, on account of the uncertainty of the time required for its completion. At the termination of the operation the upper bandage is slowly removed in order that vessels divided during the operation may be secured. If more than ten minutes be required for suturing the wound, this bandage should be replaced, as sensation returns in the infiltrated area in from eight to ten minutes after its circulation has been re-established. It is of the utmost importance that the vessels in the operation area be completely emptied before the injection is commenced. When the operation is completed and before closing the wound, the veins are washed out with warm salt solution. As an additional precaution the upper rubber bandage is loosened sufficiently to allow the blood to flow through the arteries and thus wash out still more of the novocain solution.

A limit to the extent of the tissues which can be infiltrated is set by the undesirability of injecting more than a certain quantity of the anæsthetizing fluid; 100 cc. of a 0·5 per cent novocain solution (which may be regarded as a maximum dose) should suffice to anæsthetize the field for most set operations; the area cannot conveniently be increased once operative procedures have commenced. As anæsthetic, Bier recommends novocain on account of its relative non-toxicity. A 0·5 per cent solution in normal saline gives reliable results. The amount injected varies with the size of the limb and the extent of the area to be infiltrated. From 50 to 75 cc. suffices for a moderate-sized elbow, while 100 cc. are required for a knee area. More can be employed in amputation cases, as only a small amount will subsequently reach the general circulation.

Bier reports 244 cases in which the method was adopted, with no serious complications and very few failures. Lahey[8] reports favourably from his experience in one case. Hitzrot[9] used it in three cases, Mantelli[10] in twenty, Page and Macdonald[11] in nine.

The fugitive character of the anæsthesia is, as Bier admits, a weak point in the method. Within a very few minutes after the removal of the tourniquet, sensation returns. Consequently the ligature of the divided vessels and the suture of the wound must be completed before the elastic bandage is removed. In some operations this exposes the patient to the danger of subsequent hæmorrhage if the ligation of the vessels has not been done with great care.

There is the risk of toxic poisoning. If the dose of the novocain given above is not exceeded and the complete anæmia of the limb is maintained by the tourniquet, there is little to fear on this score. But every surgeon knows the difficulty of completely cutting off the blood-supply without injuriously pressing on the nerve trunk, in the case of a stout lower limb. And lastly, the risk of embolism is sufficient to make most surgeons hesitate to use the method.

Bier himself expressly states that the method is only recommended in cases in which simple local anæsthesia is impracticable or difficult, and it should not be used in senile or diabetic gangrene.

From the above it will, I think, be seen that the method is unlikely to be widely adopted, and is to be regarded more in the light of an interesting physiological experiment than of a contribution to practical anæsthesia.

The use of **Quinine and Urea Hydrochloride** as a local anæsthetic was first advocated by Henry Thibault,[12] who used a 1 per cent solution for the purpose of injection, and a 10 per cent for application to the mucous membrane. It has since been favourably reported on by Brown,[13] Green,[14] and especially Hertzler.[15] It is claimed for it that: (1) It is absolutely safe, having no toxic action (100 grs. were given to one patient without ill-effect); (2) It is more powerfully anæsthetic than cocaine; (3) The anæsthesia is of long duration. It is the last feature which specially attracts the attention. After an injection of a 1 per cent or ½ per cent solution *perfect anæsthesia lasted for four or five days*, and perfect sensation was not restored for from ten to fourteen days.

It is therefore suggested as a valuable local anæsthetic for anal and other operations, where severe after-pains are frequently experienced. Any operation suitable for local anæsthesia can be performed with it. The technique is the same as with cocaine, etc. The strength of the solution should not exceed 1 per cent, as the injection gives rise to some fibrinous exudation, which seems to delay the healing of the skin wound. When the solution did not exceed ¼ per cent this exudation was not noticed. Accordingly, Hertzler advises the use of this strength in those cases where speedy primary union of the skin is desirable, and where the duration of the anæsthesia beyond several hours is not required.

My own experience with this drug is unfavourable. The anæsthesia, even with the 1 per cent solution, was imperfect and transitory.

Scopolamine-Morphia Narcosis.[16] — During the last few years considerable attention has been paid to the advisability of giving certain hypnotic drugs as a preliminary to the administration of a general anæsthetic. The most popular procedure on these lines, at present, is the subcutaneous injection of a small dose of scopolamine and morphia an hour or so before the anæsthetic, with a view to inducing a drowsiness as a preliminary to the administration of chloroform or ether. Other drugs which have been advocated are atropine and morphia, chloral, choretone, and hedonal. But at present scopolamine-morphia is by far the most widely used. When it was first advocated by Schneiderlin, it was hoped that it would prove capable of producing such a deep slumber that the operation could be carried out without having to resort to chloroform or ether. Experience, however, soon showed that the production of so deep a coma was accompanied by a certain amount of danger, especially in the case of debilitated patients, and that it was not advisable to administer more of the drug than was sufficient to produce a drowsiness as a preliminary to a general anæsthetic. The method most generally adopted is as follows:—

The night before the operation the patient is given 10 grs. of veronal in order to ensure a good night's rest. About an hour and a half before the operation a subcutaneous injection of morphia ($\frac{1}{8}$ to $\frac{1}{6}$ gr.), and scopolamine ($\frac{1}{150}$ to $\frac{1}{100}$ gr.) is administered. The room is darkened, and the patient told to go to sleep. The effect of the injection is to produce immediately a pleasant feeling of drowsiness, in which all fear of the impending operation is lost; and a little later the patient falls into a light sleep from which he can easily be aroused, but only to fall asleep again when he is left alone. If at the expiration of an hour the patient is neither asleep nor feeling decidedly drowsy, another similar, or slightly smaller, injection is given. In the case of women and debilitated patients somewhat smaller doses are given, whereas robust men may sometimes with advantage be given a third injection. An hour and a half from the time of the first injection a general anæsthetic (preferably ether) is given in the usual way.

Owing to the effects of the scopolamine and morphia the inducing and maintaining complete anæsthesia are singularly rapid and easy. There is no struggling or choking on the part of the patient, very little anæsthetic is required, and the rapid change from a condition of deep to partial anæsthesia, with its accompaniment of struggling and straining, is avoided. Another valuable consequence of using scopolamine-morphia is that it prevents the excessive mucous and salivary secretions which so frequently accompany and follow the administration of a general anæsthetic—particularly in the case of ether. The frequency with which bronchopneumonia follows the use of ether has long been largely attributed to the aspiration of this mucous secretion, and already a number of surgeons have reported a marked diminution in the frequency of post-operative bronchopneumonia where scopolamine-morphia has been given. (Kümmel says that since using the scopolamine-morphia narcosis the frequency of post-operative pneumonia has fallen from 2·5 to 0·61 per cent; v. Eiselberg, from 3·3 per cent to 0·9 per cent.)

The beneficial action of the scopolamine-morphia injection is perhaps even more marked after the operation. For, owing to its administration, the patient, instead of rapidly waking up to pain and discomfort, quietly passes into a peaceful sleep of several hours' duration. Lastly, the justly-dreaded post-anæsthetic vomiting is either absent or reduced to a minimum.

In the case of patients who have undergone an operation on the abdomen, this marked diminution in the liability to post-anæsthetic sickness is in itself sufficient to justify its being called "the humane anæsthetic." It may be convenient to summarize briefly the advantages of the scopolamine-morphia injection. They are as follows: (1) The patient is spared much nervous tension while being prepared for and awaiting operation; (2) He is already drowsy when the general anæsthetic is administered: consequently the full narcosis is quickly and easily obtained without distress; (3) The amount of general anæsthesia (ether or chloroform) required is greatly reduced; (4) Full

anæsthesia with perfect muscular relaxation is quickly obtained and easily maintained; moreover, there is no sudden passage from full to semi-anæsthesia, with its accompaniment of struggling on the part of the patient; (5) The secretion of mucus is lessened, and consequently the administration of ether facilitated, with diminished risk of post-operative pneumonia; (6) Absence of vomiting; (7) The operation is followed by a long and peaceful sleep; (8) Increased safety.

The value of this method of narcosis is attested by its rapidly increasing popularity. Indeed, almost every writer endorses what has been claimed for the method. Experience points to the advisability of carefully restricting the dose of these drugs, more especially that of the morphia.

Scopolamine-Morphia Narcosis in Labour.[17]—With a view to diminishing the pain of childbirth, the scopolamine-morphia narcosis has been freely tried, more especially in Germany, and the reports as to its value are in the main favourable. The first dose (scopolamine $\frac{1}{150}$ gr. and morphia $\frac{1}{6}$ gr.) is given when the labour-pains are becoming long and strong, and are recurring about every five minutes. The first effects of the drugs are generally apparent about half to three-quarters of an hour later; the patient becomes drowsy and sleeps during the intervals of the pain. A second injection (this time only of scopolamine, $\frac{1}{150}$ to $\frac{1}{200}$ gr.) is given an hour afterwards, and, if called for, is repeated an hour later. The test of the necessity, or otherwise, of a second or third dose is the feelings of the patient, and her ability to remember recent incidents of the sickroom or to recognize the hypodermic syringe or other articles when shown to her.

Prof. Krönig, who has employed this narcosis in something like 2000 cases, speaks most highly of the method, and believes it presents no drawbacks for mother or child. This favourable opinion is freely endorsed by numerous other obstetricians. The chief objections which have been raised against its use, are: (1) That it prolongs the labour by diminishing the force and frequency of the pains; (2) That it predisposes to flooding; (3) That it is dangerous to the child.

From an examination of the literature on the subject it would appear that, provided the dose of the drugs, more especially that of the morphine, be carefully controlled, these objections are not borne out in practice. How far the method is suitable for the ordinary private midwifery practice is perhaps questionable, but in maternity hospitals it certainly seems capable of greatly diminishing the terrors of childbirth.

Terminal Arterial Anæsthesia.—Ransohoff,[18] an American surgeon, advocates a modification of Bier's method, viz., that the anæsthetic should be injected into the artery supplying the area. The technique is delightfully simple; the artery (say the brachial) is first exposed under infiltration anæsthesia, then an Esmarch elastic bandage is bound round the limb some distance above the point of the proposed injection into the artery. The bandage is applied so as to constrict

the veins and not to interfere with the arterial circulation. Then from 1 to 2 dr. of a 0·5 per cent solution of cocaine in normal salt solution is injected into the vessel in the direction of the blood-stream. The needle used is as fine as possible. After the anæsthesia is complete, the Esmarch bandage may be tightened till perfect hæmostasis is obtained. At the completion of the operation the elastic tourniquet is removed and the wound closed. As 2 dr. of a 0·5 per cent solution of cocaine contain only ½ gr. of cocaine, there is no fear of toxic effects, according to the author. Ransohoff reports two successful cases of its use on patients (in the first case 1 cc. of a 2 per cent cocaine solution was used, and in the other the same quantity of a 1 per cent solution), and ten interesting experiments upon animals. This method is so simple that further experiments are to be desired.

Rectal Anæsthesia.[19]—Although it has long been known that rectal anæsthesia was a practical procedure (Pirogoff mentions it in his research on etherization, published in 1847), it has never gained many adherents. Recently, however, there has been an attempt, more especially in America, to revive and improve the method. In the earlier experiments ether was injected pure, or carried into the bowel as a solution or as a mechanical mixture in water. Later the pure vapour was used, generated by placing a bottle of ether in a vessel of hot water and allowing the vapour to be passed into the bowel. This method proved unsatisfactory, for there were no means of appreciating the amount of ether gas passing into the bowel, and the vapour going over at a high temperature was condensed in the rectum and gave rise to severe irritation and hæmorrhagic discharges.

The method employed by Cunningham is briefly as follows: The ether is placed in a large chemical wash-bottle (*Fig.* 4), and the air is pumped through the ether by means of an ordinary rubber bulb just as in the Clover's chloroform apparatus. The wash-bottle containing the ether is kept in a water-bath at a temperature between 80° and 90° F. (ether boils at 98·6° F.). Previous to the administration of the anæsthetic, the rectum is thoroughly cleared by enemata. During the administration the patient lies upon the back, with the thighs slightly flexed. A large-sized stiff catheter, or rectal tube, is inserted into the bowel for a distance of from 10 to 14 in. The efferent tube of the wash-bottle is now connected with the rectal tube, and the vapour is forced into the bowel by repeatedly squeezing the rubber bulb. The normal intestinal gas is gradually displaced by the ether vapour and escapes by the side of the rectal tube. To assist its escape the anæsthetist is advised to insert his finger into the rectum by the side of the tube.

At the beginning of the anæsthesia the patient may feel some discomfort and desire to defæcate, but in a short time this sensation disappears. The breath becomes laden with ether in from one to five minutes after the anæsthetic is started, and the patient gradually becomes drowsy and then passes into complete surgical narcosis without any stage of excitement. After the narcosis is complete,

two or three squeezes of the bulb a minute will usually suffice to maintain it. If the patient becomes too profoundly anæsthetized, the efferent tube should be disconnected, and such ether-vapour as is in the bowel forced out through the rectal tube by abdominal massage.

Cunningham says that: (1) Experience has shown that the patient usually passes under the influence of the drug rapidly and with no sense of suffocation; (2) Less ether is used in producing the narcosis and in maintaining it; (3) The stage of excitement is lessened or abolished; (4) Bronchial secretions are absent; (5) The recovery is more rapid than by the inhalation method; (6) After-effects, especially as regards liability to vomiting, are diminished or absent.

Fig. 4.—Cunningham's Apparatus for Rectal Anæsthesia.

Sutton, Legueu, Morel, and Verliac (loc. cit.) advise the use of oxygen with the ether vapour. The apparatus employed is very similar to that described above, save that in the place of the hand-bellows the afferent tube to the wash-bottle is connected with a cylinder of oxygen gas. While it is possible to produce narcosis by the rectal method, it is usual to get the patient under by inhalation and then to continue the anæsthetic by the rectal tube, and, if we may judge from the fact that in 43 cases out of 100 of rectal anæsthesia, Sutton "at some time in the operation administered a supplementary dose of ether or chloroform by inhalation," it is not always easy to maintain the requisite degree of narcosis by the rectal method alone.

The great and obvious advantage of the method is that by its means a general anæsthetic can be administered without the anæsthetist getting in the way of the surgeon during operations on or about the respiratory tract. The other advantages claimed for it are not so convincing. For instance, the employment of this method of etherization is advocated when operating upon patients in whom ether absorption must be minimized for any reason, such as disease of the respiratory organs. We must remember, however, that the greater part of the ether is eliminated through the lungs, whether it be administered by inhalation or by the rectum, and that when rectal narcosis is practised it is necessary not only to start the anæsthesia by inhalation, but also to supplement it frequently by an occasional oral administration. In the same way the claim to a marked reduction in post-operative troubles, more especially vomiting and nausea, hardly seems borne out by Sutton's own statistics. In 100 cases of anæsthesia by this method, he says that 12 belched gas from the stomach during the operation, 43 vomited or regurgitated stomach contents after operation, 12 had abdominal pains, 5 had bloody stools or blood-streaked return from the post-anæsthetic enemata, 1 patient continued to pass small quantities of blood for three days, during which time she also vomited persistently. The method has been too little practised to enable us to estimate its safety, but the reports up to date are less favourable than one would have anticipated.

Legueu, Morel, and Verliac state that cardio-respiratory disturbances are not infrequent. They attribute collapse to a sudden yielding of the ileocæcal valve, thus allowing the ether gas to rush suddenly into the small gut and there become rapidly absorbed, resulting in an overdose of the drug. They believe that this is less likely to occur if the patient is first anæsthetized in the usual manner before the rectal administration is begun, as the ether gas then passes gradually into the whole intestinal canal from the beginning and not suddenly. Cunningham thinks that cardio-respiratory disturbances are rare, but he quotes four fatal cases in his own series. Baum (loc. cit.) used rectal anæsthesia in eight cases: five were satisfactory, one had rectal hæmorrhage, and one died of peritonitis caused by rupture of an old intestinal ulcer. Sutton has given it in 140 cases: five of the patients died, though "in none of these, in the judgment of the operating surgeon, was the method of administering the anæsthetic a contributory factor."

The method is contraindicated (1) In all cases where there is a lesion of the alimentary tract, especially ulceration of the colon; (2) In all laparotomies on account of the distention of the intestines; (3) In emergency cases, because of the lack of preparation of the colon.

From the above it is evident that the rectal administration of ether is more complicated than is the oral method, and its field of usefulness is limited to cases in which it presents distinct advantages over the ordinary method. It is not suitable for the novice, but may prove a valuable addition to the armamentarium of the trained anæsthetist.

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ANAPHYLAXIS, ETC. *E. W. Goodall, M.D.*

An interesting and instructive survey of our present knowledge of anaphylaxis and its relation to clinical medicine is given by John F. Anderson.[1]

The term anaphylaxis was coined by Richet, who was one of the earliest experimental workers on the subject. It is derived from the two Greek words ἀνά, against, and φύλαξις, protection; and signifies a condition opposite to that of protection; but far from being the disadvantage we should conclude such a condition to be, "the phenomenon is probably an important step in the protection of the organism against a certain class of infection." Anaphylaxis can be induced by the injection into the body of any foreign proteid, and can be transmitted by the mother, or acquired. The reactions produced by the inoculation of tuberculin and mallein in tuberculosis and glanders are examples of anaphylaxis. It has long been known that the blood of certain animals is poisonous when injected into a human being, or into an animal of a different species from that from which the blood is obtained. The serum of horses and donkeys, however, is much less poisonous than that of most animals; but in a few cases the injection of horse or donkey serum into a human being produces, after an interval of a few days, unpleasant symptoms, now known as the "serum disease" (rashes, arthritis, and pyrexia). When injected into guinea-pigs for the first time, unpleasant effects very rarely supervene; but if, fourteen or twenty days after an injection of serum into a guinea-pig, another injection be given, the result is almost invariably fatal. The condition known as anaphylaxis has been produced by the first injection, and is brought out by the second. The amount given at the primary injection may be very small indeed: in guinea-pigs 0·001 cc. is quite sufficient to produce so sensitive a state that the second

injection of a larger amount, after the interval stated above, will almost invariably lead to death. Various proteids (animal and vegetable) will produce anaphylaxis (e.g., white of egg, milk). "A certain time must elapse between the first and second injection in order that the hypersusceptibility may be manifested. This time varies from five to twelve days, and is in close accord with the period of incubation of the 'serum disease,' which von Pirquet places at eight to thirteen days." This action of serum is not due to any antitoxin it may contain, but to a protein in the serum.

The symptoms produced by the second injection of horse-serum into a sensitized guinea-pig are exceedingly characteristic. They are thus described by Anderson: "Within five or ten minutes, when the injection is given intraperitoneally, the guinea-pig becomes restless and agitated; it runs about the cage, and sometimes utters sounds of distress; then there appear manifestations of peripheral irritation and respiratory embarrassment, as shown by scratching at the mouth, coughing, sneezing, rapid and irregular respiration. An exceedingly characteristic feature of the respiratory involvement is that at intervals the animal makes an unusually deep inspiratory effort with the diaphragm, resulting in a marked sinking at the lower end of the sternum. The stage of excitement is soon followed by one of paresis, or in some cases of complete paralysis. The animal is unable to stand, and, if it attempts to do so, falls upon its side. Spasm or general convulsions may now appear." Recovery may take place after paralysis; but convulsions invariably herald a fatal ending within thirty minutes. In a few cases the symptoms may not appear for thirty or forty minutes after the injection. Another feature of the illness of the animal is a marked fall in the blood-pressure. The heart continues to beat for some time—even as long as thirty minutes—after respiration has completely ceased. "Death is apparently due to asphyxia, and, as suggested by Auer and Lewis, is probably a result of a tetanic contraction of the muscles of the bronchioles and alveolar ducts, thereby preventing the free ventilation of the alveoli." While the condition of anaphylaxis may be produced in the guinea-pig in five days, "the optimum period for its development is after three weeks." Anaphylaxis is produced whether the sensitizing serum be injected subcutaneously, intraperitoneally, into the brain, or into the circulation.

According to Auer and Lewis, **Atropine** appears to have a preventive action against the evil effects of the second (or intoxicating) injection of serum; but on this point Anderson writes as follows, as the result of laboratory experiments made by himself and W. H. Schultz:— "Apparently the amount of atropine needed for guinea-pigs is so large that it does not seem to promise much for its practical use in man, when used in individuals known or suspected of having an idiosyncrasy for horse-serum; but further work with the substance may alter this view." The best preventive, according to Anderson, is the administration of pure **Oxygen,** along with **Chloral Hydrate** and **Adrenalin.**

One-millionth of a cc. of horse-serum and one twenty-millionth of a cc. of white of egg will sensitize a guinea-pig; and one-hundredth of a cc. of serum and one two-hundredth of a cc. of white of egg, intravenously, are fatal to a sensitized guinea-pig.

"For proteins of a very different nature the anaphylactic reaction is absolutely specific; but for proteins more or less closely related, such as that in the serum of a horse and the serum of a dog, the reaction is only quantitatively specific."

If a guinea-pig be sensitized with a given protein, and some of its blood be injected into a normal guinea-pig, the animal becomes passively sensitized to the protein, and this susceptibility becomes apparent within twenty-four hours. Guinea-pigs may be rendered immune or extremely refractory to a single large injection of a protein by giving them a number of injections of the protein. These animals can be sensitized by feeding them with a protein for several days.

The human subject can be sensitized, certainly, by horse-serum, but the intoxicating action of the serum when injected a second time is neither so constant nor so severe as in the case of the guinea-pig. In man, the reaction is usually like that which occasionally follows a primary injection. "In a few cases in man, however, the reaction is very similar to that in the guinea-pig, and these cases are the alarming ones." Anderson is of the opinion that these "unfortunate accidents, such as collapse and sudden death, depend . . . more upon individual sensitization than upon the so-called toxicity of the serum used." But there are not a few cases now on record in which most serious symptoms, and even death, have followed quickly upon a single and primary injection into a human being of horse-serum. In many of these cases the persons have either been the subjects of asthma, or have shown a peculiar idiosyncrasy as regards horses; when in the vicinity of horses, or of stables, they exhibit symptoms resembling hay fever or asthma

The knowledge of these events, even though they occur infrequently, should make us very chary about giving serum injections in a haphazard way, as might very well be done when the serum is used for prophylaxis. Serum should never be given to asthmatics.

Gillette,[2] of New York, gives a detailed account of thirty cases in which an injection, the majority primary, of serum, proved fatal, or nearly so, in the human subject. In some of these the person was asthmatic.

Miller and Root,[3] of Detroit, in discussing the cause of sudden death after an injection of serum, incline to the opinion that the cause is not due to the serum. They suggest that it may be due to the condition known as "status lymphaticus," or to unknown causes. They state that "the death may have been caused by the serum, but it does not accord with any known action of the serum."

[I should join issue with them on this point. It is true that the symptoms accompanying the death are not such as occur after an injection of serum in the vast majority of cases; but there are now a sufficient number on record, and there is also sufficient experimental

evidence in existence, to show that these symptoms (sometimes very severe) are due to the injection of serum, given more often in the case of a person or an animal who has had an injection ten days or longer before, but sometimes when the injection is a primary one, especially in asthmatic subjects. There does not appear to be any strong evidence that the "status lymphaticus" is concerned in bringing about the severe results alluded to in any large proportion of the cases, if in any at all.—E. W. G.]

Moss[4] describes a cutaneous anaphylactic reaction which can be employed as a contraindication to the administration of antitoxin. "The skin of the non-hairy, inner side of the upper arm is cleansed with alcohol, dried with a sterile sponge, and 0·01 cc. normal horse serum, preserved with a few drops of chloroform, is injected intradermally. A fine needle and a hypodermic syringe divided into hundredths of a cubic centimetre are convenient for this purpose, and undiluted serum should be used. A positive reaction consists usually of an area of inflammation 1 to 2 cm. in diameter, which comes on within twenty-four hours and disappears in two or three days. It sometimes happens that the entire reaction is over in twenty-four hours, so that an observation should be made at the end of about ten hours after the injection. The reaction is purely local at the site of injection, and in no case have any constitutional symptoms or discomfort resulted. With a negative reaction nothing is to be observed except perhaps the needle-prick, and if care be taken to introduce the needle sufficiently superficially even this may not be found."

Moss performed the test on thirty individuals. Of these nine had never received any form of serum previously, and in all nine there was a negative reaction. The remaining twenty-one persons had received serum at dates varying from four months to ten years previously. Ten of these gave positive and eleven negative results. In three of the positive cases the local reaction came on abruptly (six, eight, and twenty-four hours after the injection), and consisted of urticaria, with a surrounding area of inflammation 5 to 6 cm. in diameter. There was also marked itching.

Moss suggests that when it is proposed to inject serum into a person who has been injected with it some time previously (upwards of ten days), the test described by him should first be tried. If the local reaction occurs, especially if markedly, serum should not be injected unless the condition which calls for it is very serious.

An effect, at any rate a presumed effect, of the administration of antitoxic serum is reported by Elisabeth Collier,[5] of Denver. She writes as follows: "On entering my service as interne at the Steele Memorial Hospital for Contagious Diseases, I was surprised to learn that the nurses refused to take the periodical immunizing dose of antitoxin. On enquiry I learned that over half of them, on the administration of even 500 units of antitoxin, were troubled with a profuse clotted menstrual flow, which amounted in many cases to a hæmorrhage." Details of seven cases are given.

[I have made enquiry concerning nurses who have suffered from diphtheria and been treated with serum under my care, and have not found that the result described by Dr. Collier has occurred. But I have no experience of prophylactic injection in healthy women.—E. W. G.]

REFERENCES.—[1]*Johns Hop. Hosp. Bull.* July, 1910; [2]*Ther. Gaz.* Mar. 15, 1909; [3]*Ibid.* Feb. 15, 1910; [4]*Jour. Amer. Med. Assoc.* Aug. 27, 1910; [5]*Ibid.* May 7, 1910; see also Ascoli, *Deut. med. Woch.* June 30, 1910.

ANEURYSM. (*See also* AORTITIS *and* ARTERIES, SURGERY OF.)

Carey F. Coombs, M.D., M.R.C.P.

ETIOLOGY.—The part played by *syphilis* in the causation of aortic aneurysm is admirably defined in Osler's Schorstein Lecture.[1] After describing the development of our knowledge of the relationship between syphilis and aneurysm, he gives an account of syphilitic aortitis, which may, he says, lead to the formation of an aneurysmal sac in one of three ways. (1) The intima may split suddenly, the tension in the aorta having been raised by some special stress. (2) The wall of the aorta may be eroded by a perforating syphilitic ulcer. (3) Localized thinning and atrophy of a patch of the aortic wall may be followed by a gradual bulging-out of the weakened spot till a sacculated aneurysm is formed.

Observation of two cases of *aneurysm in young people* led McGraw[2] to search medical literature for similar records. His conclusions as to causation are that there are two factors, a predisposing congenital faultiness of the arterial wall, and a precipitating infective factor, of a gross type when it is represented by the lodgment of an infective embolus within the artery, but more often particulate and due to diffuse infection of the arterial wall, as in cases of syphilitic or rheumatic arteritis. Lewis and Schrager[3] consider that injury and infection are the chief causes of aneurysm in children. Their careful account of the acute infective type of aneurysm shows that the aorta is much less frequently affected than in the syphilitic form, and the sac not so likely to reach a large size. Like McGraw, they distinguish between aneurysms caused by infective emboli, and those caused by infective agents reaching the arterial wall in a diffused state through the vasa vasorum and inducing changes in the media and elastic tissue.

SYMPTOMS AND DIAGNOSIS.—Findlay[4] has made a careful study of the *retardation of one radial pulse* which, he says, does occur in some cases of intrathoracic aneurysm. This delay may or may not be present in the carotid pulse in the same side. Data obtained by means of physical experiments lead him to believe that the delay is due to the reservoir action of the aneurysm, which may, so to speak, absorb the pulse on one side, causing it to be delayed. If this be so, delay of the left radial pulse shows that the aneurysm is in such a relation to the origins of the great vessels that its systolic filling with blood delays the systolic filling of the left subclavian artery more than that of the innominate artery, and delay of the right radial pulse argues an

opposite relation : a fact of diagnostic value in leading to an accurate localization of the aneurysm. He considers the polygraph necessary for accurate determination of the presence or absence of this delay ; the finger is not a sufficiently delicate instrument.

The *pupillary* changes in thoracic aneurysm are divisible into three groups, according to Osler.[5] (1) The sac may, by irritation of the left sympathetic cord, cause dilatation of the left pupil ; generally the other signs of sympathetic irritation are not observed. (2) According to the observations of Wall and Ainley Walker, the relation of the aneurysmal sac to the great vessels at their origin may lead to a disparity of arterial tension in the ophthalmic arteries and in their ciliary branches on the two sides ; when this is so, the pupil is larger on the side in which the tension in the ciliary arteries is lower. This is more often the case in the left than in the right ciliary system. (3) Inequality of pupils and other pupillary abnormalities may be present in cases of thoracic aneurysm, because the syphilitic infection which caused the formation of an aneurysm also produced parasyphilitic changes in the oculomotor nuclei and consequent Argyll-Robertson phenomena (Babinski's syndrome).

Four unusual cases of intrathoracic aneurysm call for brief notice. Langwill and Pirie[6] treated a man, aged thirty-three, for eighteen months before death, with absolute rest in bed, large doses of potassium iodide, and periodic administration of erythrol tetranitrate. There were three sacs, one in each part of the aorta ; the largest arose from the transverse arch, eroded the clavicle, and burst externally. Blood first oozed, then welled up in a continuous stream without pulsation ; death occurred after 35 minutes. In Boyd's[7] case, a non-fatal one in a man of thirty-seven, who had syphilis at twenty-one, there was aortic regurgitation, a right subclavian aneurysm, and an aneurysm of the descending aorta discovered by *x*-rays. Here the pulse was full in the right radial artery and almost impalpable on the left side. Lloyd Roberts[8] describes the case of a man of sixty who had no symptoms until sudden collapse occurred during exertion. The area of skin drained by the superior vena cava became blue (without œdema) ; the external jugulars became distended, and pulsation developed in and around the aortic area with a harsh systolic and a quieter diastolic murmur. Post-mortem examinations showed a large aneurysm of the ascending and transverse aorta opening into the superior vena cava. M'Crae's[9] case was an example of rapid death from rupture of a quite small aneurysm of the transverse arch, with hæmorrhage into the retropleural tissues.

Guisez[10] alludes to the value of *broncho-œsophagoscopy* in the diagnosis of aneurysm. He has observed compression of the trachea associated with visible pulsation ; also a pulsatile tumour bulging in the wall of the œsophagus from without.

Osler[1] considers that syphilitic aneurysms are characterized by the propensity to sudden death ; by their occurrence especially in the third and fourth decades ; by their frequent association with angina

and aortic regurgitation ; and by the prompt relief afforded by treatment with potassium iodide.

Aneurysm of the Pulmonary Artery.—Two cases of this rare condition have been recorded. Barth's[11] was a man of fifty-seven, whose aneurysm was due to syphilitic arteritis of the pulmonary artery ; Reiche's[12] was a patient with actinomycosis of the lung, in whom a continuous rushing murmur, louder at the beginning of systole and of diastole, and not altered by position or by respiration, was heard over a limited area around the pulmonary cartilage. This he ascribes to an aneurysm the size of a cherry arising from the main trunk of the pulmonary artery near its origin.

Treatment.—At a meeting of the College of Physicians of Philadelphia,[13] Beardsley reported a case of aortic aneurysm treated by the Moore-Corradi method. Thirty-two feet of **Gold Wire** were fed into the sac and used for an hour's transmission of a **Galvanic Current,** gradually rising from zero to a voltage of 50 milliampères. Diminution of pain and of pulsation followed. Hare remarked that he had sixteen times wired an intrathoracic aneurysm, pain being much relieved in twelve instances. No anæsthesia is necessary. Eshner's[14] paper tabulates the literature of the subject, and contains a record of two new cases.

St. John Hely[15] believes in Abram's "spondylotherapy" as a treatment of thoracic aneurysm. This consists of percussion of the seventh cervical spine by a series of rapid, moderate blows with a pleximeter, for five to fifteen minutes daily, the séance being interrupted to prevent damage to the skin. Hely, who was at first sceptical as to the value of this (as well he might be), noted a 25 per cent reduction in the size of the aneurysmal tumour after a week of treatment. It is actually suggested that this method acts by mechanical stimulation of the centre supplying vasoconstrictor nerves to the aortic wall.

References.—[1]*Brit. Med. Jour.* Nov. 27, 1909 ; [2]*Ann. Surg.* July, 1909 ; [3]*Jour. Amer. Med. Assoc.* Nov. 27, 1909 ; [4]*Pract.* Dec. 1909 ; [5]*Ibid.* Ap. 1910 ; [6]*Edin. Med. Jour.* Mar. 1910 ; [7]*Ibid.* ; [8]*Liver. Med.-Chir. Jour.* Jan. 1910 ; [9]*Montr. Med. Jour.* Ap. 1910 ; [10]*Arch. des Mal. du Cœur,* etc. Ap. 1909 ; [11]*Frankf. zeits. f. Pathol.* vol. v, p. 139 ; [12]*Münch. med. Woch.* Oct. 19, 1909 ; [13]*N.Y. Med. Jour.* Ap. 16, 1910 ; [14]*Amer. Jour. Med. Sci.* Oct. 1910 ; [15]*N.Y. Med. Rec.* May 21, 1910.

ANGINA PECTORIS. *Carey F. Coombs, M.D., M.R.C.P.*

The whole subject of angina pectoris has been exhaustively considered in Osler's Lumleian Lectures,[1] based on a study of 268 cases.

General Etiology.—Two hundred and thirty-one of the patients were men, 37 women ; of the former, 211 were severe and 20 mild cases ; of the latter, 14 were severe and 23 mild. Most cases occur between forty-five and sixty-five ; thus, doctors, and all who work hard and bear much worry, are specially subject to angina.

Morbid Anatomy.—From this point of view three groups of cases exist : (1) Aortitis due to syphilis, limited to the suprasigmoid part of the aorta, often associated with aneurysm and with lesions of the

aortic valves ; (2) Changes in the coronary arteries : narrowing of the orifices, diffuse endarteritis or atheroma, thrombosis, etc. ; (3) Cases in which nothing is found post mortem to account for the attacks.

Pathogenesis of the Attack.—Osler regards the pain of angina pectoris as due to contraction of the myocardial fibres in response to stretching. Sudden death, he considers, is brought about by reflex inhibition of the respiratory centre. Bramwell's[2] conception of the mechanism of the attack is very similar. The pain is, as all are agreed, referred to the skin areas which correspond segmentally with those sympathetic fibres which are being irritated in the heart wall. The nature of this irritation is in doubt ; Bramwell's opinion seems to be that it is a mechanical one, produced by the pressure upon nerves of myocardial fibres hardening in a sudden contractile response to over-strain of the left ventricle, either absolute or relative. The association of coronary disease with angina is explained by the greater ease with which over-strain is felt by a myocardium starved of its blood-supply. May,[3] who has made a systematic study of cardiac pain, suggests that the cardiac nerves are irritated not mechanically but chemically, by products of disordered metabolism within the myocardium, a very attractive hypothesis.

Clinical Features.—Osler divides his cases into three principal groups :—

1. "*Formes Frustes.*"—Such are often excited by emotion. In overworked persons again, a persistent sense of substernal tension may be associated with high blood-pressure ; this rarely develops into characteristic angina.

2. *Mild Forms.*—This group includes the neurotic and the toxic forms. In the neurotic class he distinguishes a vasoconstrictor and a vasodilator type of attack ; in the former, the hands often become cold and numb, while in the latter they are red and hot, the arteries throb, and the head feels full. These attacks are especially common in women. The toxic cases are few in number, and may be due to excess in tea, coffee, or tobacco.

3. *The Severe Form*, or angina major, is almost always seen in men. There are four sub-groups of cases of this type : (*a*) Death in the first or second attack, or in a status anginosus. (*b*) Death after a series of attacks covering months or years. (*c*) Death after attacks occurring frequently for a period of over ten years. In such cases the attacks are often excited by some one cause, some special exertion for example, which never fails to bring on the paroxysm. (*d*) A small group of patients who, after a series of severe attacks covering periods of two years and upwards, become quite free from angina and recover completely.

The Exciting Causes of attacks are of three kinds, exertion, emotion, and food. In this connection it is interesting to note Thomson's[4] experience, that true angina occurs oftener by night than by day. Osler describes four *extra-pectoral* forms of angina :—

1. The pain may be peripheral in distribution, attacking the arm

and sparing the chest. The paroxysm may begin with crural pain and claudication; the pain may be referred to the right pectoral muscles, or even to the testes.

2. Abdominal pain is associated with angina in nervous patients; it may entirely take the place of thoracic pain, or it may be an additional feature in a characteristic attack. (*See also* abstract of Kreuzfuchs' article in the paragraph on ARTERIOSCLEROSIS.)

3. There is a respiratory form of angina. The paroxysms, which occur especially at night, are associated with high arterial tension, and may alternate with true angina. The four characteristic features are acute distention of the lungs as in asthma, rapid development of bubbling râles, acute œdema of the lungs, with expectoration of much thin, sanious fluid, and a sharp rise of blood-pressure.

4. Various cerebral symptoms may be associated with angina: unconsciousness, epileptiform fits, transient hæmianopia, hemiplegia, aphasia, etc.

PROGNOSIS.—The causation is, of course, of the greatest importance in a consideration of the prognosis. Syphilitic and "functional" cases are amenable to treatment; not so those due to coronary atheroma. Three other points that must be taken into account are the type of patient, the character of the attack, and the state of the heart and arteries. Is it possible for the patient to shut off steam? And will he do it? As to the character of the attack, two bad signs are noted: respiratory disturbance, and slowing of the pulse with irregularity. Attacks excited by exertion are more likely to be of grave significance than those following emotion. The mild cases do well; those of toxic origin cease after removal of the cause. Sternberg[5] points out that pericarditis immediately following angina spells coronary thrombosis or rupture of the heart, and is of fatal prognostic import.

TREATMENT.—Those patients in whom there is any likelihood of a syphilitic origin for the disease should be thoroughly treated with **Mercury** as well as with **Iodides.** For the neurotic cases Osler advocates **Weir-Mitchell Treatment** combined with **Hydrotherapy** in the form of wet packs. **Counter-irritation** over the heart is also recommended. Such patients should never be told that they suffer from angina pectoris. It is best to avoid drugs, for patients of this kind are only too ready to take anything and everything. Two exceptions are made to this rule: in patients with high arterial tension and in cases of tobacco angina, the **Nitrites** are valuable, while for the vasodilator form of neurotic angina **Ergotin** should be given in doses of two or three grains three times a day. In the severer types of attack Osler recommends **Amyl Nitrite**; if this does not relieve pain, **Morphia** should be given, and if this fails (as it may in cases of status anginosus), **Chloroform** may be used without fear. Morison[6] adopts the same attitude, and advises the same measures in the same order, saying that the pain, which may of itself be fatal from "shock," must be relieved somehow. Franze[7] recommends the application of heat; the hands and feet should be immersed in water at a temperature of 42° C., and a hot bottle at the same

temperature applied to the precordium. He also gives the following prescription :—

℞	Fol. Digital. Pulv.	gr. $\frac{1}{6}$	Diuretin.	gr. viiss
	Caffein.	gr. iij	Morph. Hydrochlor.	gr. $\frac{1}{12}$

Ft. caps. One to be taken early in the attack ; to be repeated in half an hour if necessary.

Oxygen is of value in the respiratory form.

Between the attacks, **Digitalis** is indicated if acute weakness follows a severe paroxysm. **Theobromine,** 20 to 30 gr. daily, is recommended on the authority of Marchiafava. Finally, Osler says that the advice of most pressing importance to those persons in whom anginal attacks are associated with a high blood-pressure is, " Go slowly—eat less."

For the employment of **Alcohol** by inhalation, see *page* 5.

References.—[1]*Lancet*, Mar. 12 and 26, Ap. 9, 1910 ; [2]*Brit. Med. Jour.* Jan. 15, 1910 ; [3]*Ibid.* Jan. 1, 1910 ; [4]*Brist. Med.-Chir. Jour.* Sept. 1909 ; [5]*Wien. klin. Woch.* Jan. 1, 1910 ; [6]*Lancet*, Jan. 8, 1910 ; [7]*Folia Therap.* Ap. 1910.

ANGIOMA.

Radium in (*page* 83).

ANKYLOSTOMIASIS. *J. W. W. Stephens, M.D.*

C. W. Stiles[1] opened the conference held on this subject in Atlanta, Ga., in 1910. The hookworm was first described in 1782 by Goeze. In 1789 Frölich latinized the German word, calling the worm *Uncinaria*, and in 1843 Dubini found the worms at an autopsy at Milan and called them *Ankylostoma duodenale*. In 1879 they were proved by Grassi, Perroncito and others to be the cause of the St. Gothard tunnel anæmia. It was an Italian, Bozzolo, who first suggested the use of thymol in the treatment. The American worm differs from the Old World one, and is almost exclusively *Necator americanus*—the American murderer : a title well deserved ! In America the heaviest infection occurs in the Appalachian region, and in general the clay land and the sand-belt regions are less infected. In 130 cotton mills in the southern states, one out of every eight employees are so infected with hookworms that the diagnosis can easily be made without a microscopic examination.

N. Evans[2] discusses the pathology, pointing out that mild and severe cases must be separated. In sixty-four recorded cases, all light and without symptoms, the hæmoglobin varied from 80 to 91·5 per cent, while in another sixty-two mild cases the hæmoglobin was 90. In 579 cases from Porto Rico, selected at random, the hæmoglobin averaged 43 per cent, falling as low as 8 per cent. In the severe cases there is a decided reduction of red cells. As regards leucocytes, there may be a leucocytosis, a leukopenia, or a normal value. As regards the relative proportion of leucocytes, eosinophilia is almost a constant finding, but most observers agree that the degree of eosinophilia is *not* a measure of the severity of the infection, and, indeed, may be absent in severe chronic cases. A rise in the eosinophilia is of good omen, while a fall

is the reverse. In fact, good resistance to the hypothetical toxin is expressed by eosinophilia. Moreover, in severe cases the blood picture may resemble that of primary pernicious anæmia; thus, in three out of nineteen cases recorded by Ashford the hæmoglobin index was 1 or greater. Normoblasts may be present, but they are scanty. Most observers are agreed that there is little relation between the number of worms and the severity of the symptoms, and that the symptoms are not due to loss of blood, but to some unknown toxin. Post mortem there is marked œdema of the lower extremities, some ascites, pleuritic and pericardial effusion, and considerable general anasarca. Intense pallor of the skin exists, but fat and muscle are well preserved. (In Egypt Sandwith records just the reverse.) Cardiac hypertrophy and dilatation are not uncommon. The hæmolymph glands are enlarged. The liver shows fatty degeneration. The spleen is enlarged, soft, and has a wrinkled capsule. The Malpighian corpuscles are reduced in size. Fatal cases nearly always show a chronic parenchymatous nephritis. In the convoluted tubes there is fatty degeneration and desquamation of epithelium, and in other parts there are exudate and casts. In severe cases there is slight albuminuria. The marrow has generally undergone changes similar to those in pernicious anæmia. The worms are usually confined to the upper part of the jejunum, with a certain number in the duodenum. Occasionally also they occur in the stomach and ileum, but never in the colon. The jejunum especially is the seat of severe catarrh, and there is much mucus in the gut, and further there is atrophy and degeneration of the intestinal and gastric mucous membrane. At the point of attachment of a worm there is a superficial erosion ½ mm. in diameter. Others describe petechial hæmorrhages where the worms are attached, and state that they are buried for half their length in the mucosa. There is also a discrepancy as to the presence of blood in the fæces. Thus, in one series of 10,000 cases, in only five could blood be detected in the fæces microscopically, while Stiles states that in 80 per cent of medium and severe cases blood can be detected by the blotting-paper test. [Some fæces are placed on white blotting-paper, and allowed to remain for from twenty minutes to some hours. A reddish-brown stain results.—J. W. W. S.]

G. Dock[3] emphasizes the fact that in many cases there are few or no symptoms, the only evidence being eggs in the stools. Such cases pass gradually into those with a sallow skin, digestive disturbances, and perhaps pain in the belly. The muscles are soft and flabby, and fatigue is easily induced. Palpitation, dizziness, and tinnitus are often associated. In the moderate cases, pallor and dyspeptic symptoms become more prominent. Nausea and epigastric tenderness are common. Accentuated heart murmurs and more or less dropsy are present. Muscular weakness is often pronounced, and there are various other symptoms. In the severe cases, anæmia, weakness, and dyspepsia are more pronounced. Œdema occurs in various situations. The appetite is either lost or voracious, with various perversions, such

as eating dirt, hair, etc. Dyspnœa and cardiovascular symptoms are intense. In childhood the disease causes a lack of development, so that a person of twenty may resemble one half that age. The face has a tired, anxious expression. The scleræ are white or bluish-white, and do not show the fine granular yellow subconjunctival fat characteristic of idiopathic pernicious anæmia.

TREATMENT.—H. F. Harris[4] states that the treatment is simple. The patient is advised to eat little dinner and no supper. In the afternoon he is given from 2 to 10 gr. of **Calomel** according to age. If the calomel acts freely in the night, no other purge is given; but, if not, in the morning a full dose of Epsom salts in hot water is given when the patient wakes. As soon as the bowels are thoroughly cleaned, finely powdered **Thymol** in capsule is given. The dose is divided into two parts: one is given at once and the other after an hour's interval. The dose is as follows: Up to 5 years, 7 to 10 gr.; 5 to 10 years, 10 to 20 gr.; 10 to 15 years, 20 to 40 gr.; 15 years and upwards, 40 to 60 gr.; but the exact and not the *apparent* age, and also the strength of the patient, should be considered.

The patient is allowed no food during the day of treatment, but may be given one or more cups of coffee during the day. If the thymol has produced no ill effect, a hot saline purge (not castor oil) is given about 4 to 5 p.m. After the bowels have acted well, food may be given. If the treatment is carried out faithfully, a repetition is rarely necessary. The fæces should, however, be examined in a fortnight's time, to see if eggs are present; if so, the treatment must be repeated.

C. C. Bass[5] gives figures showing that a simple microscopic examination of the fæces is insufficient for the detection of mild cases. The fæces must be centrifuged. They are diluted about ten times with water, and centrifuged for a few seconds at a rate of about 3000 revolutions per minute. Pour off the supernatant fluid. Shake up the sediment with water, and centrifuge again for a few seconds. Repeat until the supernatant fluid is nearly clear. Examine the sediment. The use of a calcium chloride solution of specific gravity 1050 will remove still more material than water. If a purgative followed by a milk diet for a day or two has been given, the process is still easier. The possibility should be borne in mind of females living after they have ceased to lay eggs. In a series of 247 female *Necator americanus* examined by the author, 18, or 7 per cent, contained no eggs. Probably males do not live longer than females, as they are less numerous in post-mortem material.

A. A. Jones[6] administers **Thymol** in the following way: No supper, a dose of salts at bedtime; no breakfast, from 10 to 40 gr. of thymol at 7 a.m., repeated at 9 a.m. Another dose of salts at 11 a.m. The fæces are strained through a thin cloth or sieve to find the worms. This treatment should be repeated two or three times for the first week, unless it weakens the patient. If so, it is repeated once a week. On days when thymol is not given, iron should be administered.

A. G. Fort[7] finds thymol, **Beta-naphthol and Chloroform, Oil of Eucalyptus,** and **Castor Oil** are all excellent.

C. A. Wells,[8] working in Georgiana, finds that hookworm disease does not occur among children five years of age and under, and to no great extent over twenty-seven years. The usual symptoms are little in evidence in fully one half the cases examined. Patients improve immediately after the worms have been expelled, but a great many seem unable to recover completely. "Ground-itch" is the chief, but not the sole, mode of infection. It is recognized that the term "ground-itch" is a vague one. Hookworms may live in the intestines from two to twelve years. It is interesting to note that *Hymenolepis nana* occurs in about 3 per cent of cases examined.

E. E. Lindeman[9] draws attention to the fact that thymol is occasionally given in such a way that it passes through the gut in a solid mass, when of course it has no action. This is due to the fact that thymol in capsules tends to form solid lumps, and not a fine powder, when acted upon with acidulated water. The author finds that this can be entirely avoided by triturating the thymol with milk-sugar, and then packing loosely in capsules. Before administering, the cachets are softened in water to the consistency of a raw oyster. The patient should be placed on the right side in bed. A purge has been given the previous evening, and food has been stopped from the previous noon. Whisky, beer, wine, and oils are forbidden, as all these dissolve thymol. The thymol should be retained two to five hours if possible. Epsom salts are used for expelling the drug and the worms; the nauseating effects of the salts can be counteracted by dissolving them in the smallest possible quantity of water. A large quantity of water or other fluid is then given, so that the mixing takes place in the stomach. The patient may begin to eat when the bowels are well moved, avoiding alcohol, etc., for this day. Beta-naphthol is not so toxic to the parasite as thymol, but has a more toxic action on the kidneys.

B. K. Ashford and P. G. Igaravidez[10] describe the campaign carried out in Porto Rico against the disease. They state that ground- or dew-itch is the first sign of infestation, and to avoid it, shoes should be worn and earth pollution stopped. Five doses of thymol given a week apart are sufficient practically to cure nearly every patient, and to reduce the power of infectivity of the patient to the soil about nineteen-twentieths. Direct sunlight, in England at least, has no deterrent influence on the development of ova, nor in destroying larvæ. Though it appears certain that the ankylostomes of man and of dogs belong not only to different species, but also to different genera, yet the dog can be infected with the human worm; though attempts at infection of dogs often fail. The period of infection either by the mouth or through the skin is about the same, viz., thirty to thirty-five days. In the examination of fæces it is important to remember that an examination may be negative for days, and then positive, with numerous ova. The most effective larvicide, taking various points into

consideration, appears to be sulphate of iron, costing £8 a ton. A 1 per cent solution of this would cover sixty miles, a yard wide and a third of an inch deep; but the purification of an area is difficult.

T. Oliver[11] discusses some of the biological aspects of the problem, more especially as affecting non-tropical countries. He quotes Looss's statement that encapsuled larvæ live in water for three hundred days, and Tenbolt's that they live for months, probably years, and that the life of the mature worm may be five or six years. The author has kept larvæ alive for eleven months in water; and others have found larvæ in the sludge of a mine ten months after it had been closed, but there is no evidence that larvæ can multiply outside the body. The best temperature for hatching larvæ from ova is from 25° to 35° C. Larvæ will withstand a considerable degree of cold, and even if frozen in a block of ice they can be brought to life again. Cold retards segmentation of ova; but fæces may be frozen, and yet on thawing the larvæ will hatch again.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Jan. 29, 1910; [2]*Ibid.*; [3]*Ibid.* Feb. 5, 1910; [4]*Ibid.* p. 485; [5]*Ibid.* Feb. 19, 1910; [6]*Ibid.* p. 645; [7]*Ibid.*; [8]*Ibid.* June 11, 1910; [9]*Ibid.* May 28, 1910; [10]*Ibid.*; [11]*Lancet*, Feb. 5, 1910.

ANTERIOR TARSALGIA (Morton's Disease).

Priestley Leech, M.D., F.R.C.S.

Mackenzie Forbes,[1] of Montreal, in an inveterate case of this disease, obtained a cure by detaching the tendons of the extensor from the hyperextended toe, and transplanting it to the head of the metatarsal bone. This operation was planned on the supposition that the secondary symptom of this affection, viz., spasm of the extensor, causes hyperextension of the affected toe, and acts in depressing the head of the metatarsal bone, thus increasing the pain and pain-giving deformity.

REFERENCE.—[1]*Montr. Med. Jour.* June, 1910.

ANTHRAX. *E. Graham Little, M.D., F.R.C.P.*

Herley[1] reports eight cases of anthrax, treated by **Excision** and **Sclavo's Serum** combined in all except one case, where excision was not performed. In only one case did the patient die. The amount of serum injected at one time was usually 20 to 40 cc.; in one case as much as 190 cc. was given in one week, and resulted in recovery. In another very severe case, which recovered, 110 cc. were given in two days.

REFERENCE.—[1]*Lancet*, Dec. 4, 1909.

AORTITIS. (*See also* ANEURYSM, ANGINA.)

Carey F. Coombs, M.D., M.R.C.P.

The development of our knowledge of the syphilitic origin of mesaortitis is traced in an interesting paper by Longcope.[1] His special point is the association of aortic insufficiency uncomplicated by other valvular disease with syphilis. As he points out, this type of valvular disorder

is rare after fifty, and is therefore not to be associated with endarteritis deformans ("atheroma"). The majority of such uncomplicated cases of aortic insufficiency (81·5 per cent in his series) are associated with a mesaortitis which is generally syphilitic and tends to spread to the aortic valves.

Osler, in his Schorstein Lecture,[2] gives a full account of syphilitic aortitis in its relation to aneurysm. It is a strictly localized process at first, attacking the suprasigmoid part of the aorta especially. It has the appearance of a cicatricial change, the aortic intima being marked by pits and linear furrows; there are also translucent patches of atrophy. Microscopic examination shows necrotic change in the media, fragmentation of the elastic fibres, and cellular infiltration between the elastic and muscular fibres of the media. The adventitia shows areas of cellular infiltration, and the intima, though atrophic in places, more often shows compensatory thickening without calcification. Spirochætes have been demonstrated in sections. The connection between this process and the formation of aneurysm has been detailed in the paragraph on the latter subject (p. 167).

In the same article, as well as in his first Lumleian Lecture,[3] Osler calls attention to the syndrome which is characteristic of syphilitic aortitis: angina pectoris, aortic regurgitation, and aneurysm. Papers by Donath[4] and Krefting[5] support belief in the syphilitic nature of cases presenting this syndrome, by the evidence afforded by the Wassermann test in such cases; the former, indeed, found it positive in twenty-three out of twenty-seven cases of aortic disease. There are, of course, cases of syphilitic aortitis which do not conform to this clinical picture; Letulle,[6] for example, records two instances of sudden spontaneous rupture of the aorta, due to syphilitic weakening of the wall. Then, again, there are cases in which, without any definite aneurysm, the aorta is diffusely dilated. Such patients may or may not have aortic regurgitation; they may be quite free from angina, or cardiac pain may be present in its constant and not in its paroxysmal form. The evidences of aortic dilatation which these patients present are an accentuated, low-toned second sound at the aortic cartilage; some dullness or impairment of resonance at the inner end of the second right interspace, possibly with faint pulsation in the same area, and a diffuse increase in the area of the *x*-ray shadow of the aorta. Often it is possible to obtain a syphilitic history in such cases; even if not, the case should be regarded and treated as syphilitic when the patient is under fifty, and free from great increase of blood-pressure and from evidences of rheumatic heart disease. The antisyphilitic treatment should include **Mercury** as well as **Iodides**; it should be pushed especially if it can be associated with **Rest** in bed; and its beneficial results are sometimes astonishing, especially in the mitigation or complete disappearance of angina.

References.—[1]*Jour. Amer. Med. Assoc.* Jan. 8, 1910; [2]*Brit. Med. Jour.* Nov. 27, 1909; [3]*Lancet*, Mar. 12, 1910; [4]*Berl. klin. Woch.* Nov. 8, 1909; [5]*Ibid.* Ap. 18, 1910; [6]*Presse Méd.* 1910, No. 21.

APPENDICITIS. *John B. Deaver, M.D., LL.D.* / *D. B. Pfeiffer, A.B., M.D.* } *Philadelphia.*

The diagnosis of appendicitis is usually too easy to deserve special comment. In individual cases, however, difficulties may arise from (1) The unusual location of the appendix ; (2) The inconspicuous character of the symptoms or their reference to distant sites or organs ; or, (3) Simulation of appendical disease by other conditions. In a contribution, " Ueber Perityphlitis auf der likken Seite," Karewski[1] points out that occasionally all the localizing signs and symptoms may be confined to the left side of the abdomen. He is not referring to those cases in which, by an extension of inflammation from the cæcal region to the left side of the abdomen or pelvis, there is found marked tenderness over the left iliac fossa, and occasionally a left-sided abscess. In these cases the course of the disease usually makes the diagnosis clear.

Those cases which present left-sided symptoms and signs from the first and throughout the course, are due to a left-sided situation of the appendix, the result of acquired or congenital causes. Four forms are distinguished. The rarest is in the condition of situs inversus. Next in order, but also rare, is primary left-sided position of the cæcum with its appendage. The third form is seen most frequently in children, when the appendix may be excessively long, and stretch obliquely across the pelvis behind the bladder into the left side. When the inflammation affects the tip primarily, the inflammatory symptoms may be manifested upon the left side exclusively. Finally, in adults, as the result of previous adhesive inflammation, a mobile cæcum may be drawn into the left side. Illustrative cases of the last three groups are cited. The diagnosis may be made presumptively by excluding other causes of peritonitis in this location.

The differential diagnosis of certain cases of pneumonia with symptoms referred to the right iliac fossa, admittedly difficult, has been given renewed interest by a communication of John B. Roberts,[2] suggesting on the basis of certain clinical experiences, that congestion of the lower lobe of the right lung may be an early symptom of appendicitis. He calls attention to a moderate impairment of percussion resonance and a slight roughening in the character of the vesicular murmur, which he thinks he has noticed at the base of the right chest posteriorly in some patients who have subsequently developed decided evidence of appendicitis, and in whom the pulmonary congestion or atelectasis has then disappeared. This may be due to spasmodic diminution of action of the right side of the diaphragm and the lower thoracic muscles, or possibly to reflex vascular congestion. In any case, infection would seem to gain more ready foothold on the basis of such stasis, and in this way appendicular inflammation may be responsible for localization of a pneumonia in this region. This reverse action has been considered by other clinicians, and should be the subject of continued observations.

Great interest in diagnosis and treatment now attaches to cases of

chronic appendicitis in which, without noteworthy symptoms in the region of the appendix, there are present various disturbances of the digestive functions, usually characterized simply as indigestion. That a high grade of chronic appendicitis may exist without local signs or symptoms and be the cause of gastric derangements, is now certain, and not a few cases have been reported in which these disturbances have ceased after removal of the appendix, so that the chain of proof is complete. Usually, in these cases a careful history will reveal suggestive attacks, and often there is slight tenderness and a sense of resistance over the seat of the appendix, but this is not always the case.

At the present time no inquiry into the cause of so-called indigestion is complete without carefully considering the possibility of participation of the appendix, and especially a thorough palpation of this region. A proportion of "bilious attacks," if investigated in this way, will be found to depend upon chronic appendicitis. This is the subject of a communication by F. J. Steward,[3] who cites several cases in point. He advances as an explanation of the pain and other disturbances of digestion the irritation to the chronically inflamed or adherent appendix caused by the peristalsis incident to digestion. Morris long ago advocated the possibility of irritation by cicatricial tissue of the nerve filaments of the sclerotic appendix causing reflex disturbances of motor and secretory characters. Recently, the phenomenon of reflex pylorospasm has been invoked to explain the phenomena of gastric symptoms in certain cases. Steward refers to Rovsing's sign as helpful in some instances. This consists of pain in the appendix region elicited by the pressure of gas driven into the cæcum by compressing the descending colon with the hand. In our hands this has been unreliable; but it should be looked for, especially in women, for Kopylov[4] has recently pointed out that it may serve occasionally to differentiate between chronic disease of the appendix and affections of the adnexa.

From the belief that the treatment of appendicitis is entirely a surgical problem there are to-day few dissenters, these being exclusively confined to a few ultra-conservatives whose experience has been either narrow, or exceptionally fortunate in non-operative treatment. The reason for referring all cases at once to the surgeon is well stated by an internist, M. H. Fussell,[5] as follows: "I thoroughly believe that at least three-fourths of the cases of appendicitis would recover if not operated upon, but I know there are no symptoms that will tell when a case is approaching the danger line, until it is extremely dangerous either to interfere or to wait."

The reports of the past year emphasize the fact that delay in operation is the most important factor in raising the mortality. McWilliams[6] analyzes 687 cases of acute appendicitis operated upon at the Presbyterian Hospital, New York, with reference to this point. Of 20 cases operated upon within the first sixteen hours of the beginning of symptoms, one died of acute pericarditis in association with chronic valvular disease, a complication which could hardly be attributed to

the disease, as the abdominal conditions were satisfactory. Of 115 cases operated upon between the sixteenth and twenty-fourth hours after onset, 4 died (3·4 per cent). On the second day there were 145 operations with 9 deaths (6 per cent), on the third day, 103 operations with 8 deaths (7·7 per cent). The fourth day gave a death-rate of 18 per cent (72 operations, 13 deaths). On the fifth and sixth days the mortality was 14 per cent.

From the clinic at Malmö,[7] Fritz Bauer reports 261 cases of acute appendicitis operated upon within the first twenty-four hours after onset, with a mortality of 2·6 per cent, and 207 during the second twenty-four hours, with a mortality of 5·7 per cent. These statistics embrace a period of several years, and do not represent the most favourable figures. Murphy[8] has reported a series of 42 acute cases associated with diffuse peritonitis operated upon within the first forty hours, with 2 deaths, and Deaver[9] had but one fatality in a similar series of 63 cases. These results were obtained in the most severe class of cases, and furnish a very instructive exhibit of the possibilities of surgery if used in the early hours of the disease. These facts have brought the profession as nearly to a unanimous opinion as it seems possible to expect in "many men of many minds," and it reduces the practitioner's duty to very simple terms, namely, to diagnose the case, to institute such treatment as will obviate the possible spread of peritonitis, and to call the surgeon without delay. Any other course will sooner or later lay him open to criticism in permitting a case to enter the stage of incurable peritonitis. The tact and ethics of the surgeon are called upon too often to shield the doctor in such cases from the wrath of the family, a task which becomes yearly more difficult, owing to the diffusion among the laity of knowledge concerning this disease and its treatment.

The treatment of appendicitis, preliminary to surgical measures, when suspected, or after definite diagnosis, is a matter concerning which there is too little general knowledge and agreement. It is a common practice to give these patients a purge when first seen. The general practitioner sees so many cases of gastro-intestinal derangement which are signally benefited by purging, that a false analogy has been drawn concerning its efficacy in the early stages of appendicitis. Except in those milder cases of catarrhal appendicitis which are only a part of an enteritis or colitis, it is difficult to see any great value in emptying the bowel; but it is easy to see that in the severe cases, to set up active peristalsis may mean to inhibit the formation of defensive adhesions and to spread infective material throughout the cavity. In the initial stage, before the diagnosis is readily made between simple colic and appendicitis, and before the advent of local pain indicates that the inflammation has reached the peritoneal covering, it is admissible to give a rapidly acting purge, such as castor oil or a saline. After the pain is localized, and nature is endeavouring by stiffening the surrounding muscles to secure rest for the inflamed member, it is irrational to nullify her efforts from within, and every

surgeon who has watched this point has observed that, in general, cases which have been purged at this stage are likely to be more severe. If it is desired to move the bowels, enemata should be employed. Quiet for the inflamed focus may be furthered by withholding all food and liquid by mouth. An ice-bag over the right iliac fossa will cause the patient to lie more quietly in one position, will relieve the pain, and discourage too many examinations. It is wise to raise the head of the bed or place the patient in a semi-sitting posture, in order to encourage the gravitation of fluid exudates or extravasations into the pelvis. Fluid for the body may be supplied by the rectal instillation of saline solution in intermittent or continuous form. If these precautionary measures are taken and the surgeon is summoned at once, a fatality will be a great exception. No morphia should be employed, as the pain is rarely too great to be endured, and by its use the patient and physician are often lulled into a false sense of security until peritonitis is too firmly established for any method of cure.

After the early favourable period for operation, which may be averaged as within forty hours after onset, surgical advice and practice lack uniformity. This is another way of saying that late cases are unsatisfactory to treat from the standpoint of results. In subacute cases, all agree that operation should be done at once, but in profoundly toxic cases with evidence of diffuse peritonitis, surgeons are still divided into two camps, which the reports of the year seem insufficient to reconcile. McWilliams (loc. cit.) argues for the immediate operation as follows : " In a remarkable series of appendix operations published by Guerry,[10] and treated by the Ochsner method, he says that those patients coming into his hands on the third or fourth days were tided through this period of great danger, and ' several days ' later were safely operated upon for localized appendicitis. Again, Haggard[11] suggests waiting until the tenth to the fourteenth day. Stanton[12] says, ' if things are let alone for a few days, it will be found that all these patients at the eighth or ninth day have localized abscesses, an easily treatable—surgically drainable—lesion. These abscesses should not be allowed to go beyond this period, for it is after the twelfth day that we find the pus beginning to seek exits of its own—pyæmia, metastatic abscesses, etc. If we take Guerry and Stanton's time to operate as any day from the seventh to the tenth, by analyzing our statistics we find that we have not got as good results as if we operated from the third to the sixth day inclusive. For, from the seventh to the tenth day inclusive, the mortality was 20 per cent of those operated upon during that period (79 operations, 16 deaths), as against a mortality of 12 per cent of those operated upon from the third to the sixth day inclusive. If we take Haggard's time for operation as from the tenth to the fourteenth day inclusive, we find that the mortality is 15·3 per cent (52 cases, 8 deaths), which is a somewhat better showing than operations performed from the seventh to the tenth day inclusive, but not so good as the results obtained when the operations were performed from the third to the sixth day."

McWilliams suggests that the types and dangers of appendicitis may vary in different sections of the country.

Deaver (loc. cit.) states his position as follows: "My practice as to operation in these cases, when ill more than forty to fifty hours, depends upon the presence or absence of some definite localizing sign of the original seat of the peritonitis. When the patient's abdomen is uniformly rigid, uniformly distended, and I cannot detect any point of excruciating tenderness in the right iliac fossa, flank, or loin, and the appendix cannot be located in the pelvis by rectal or vaginal examination, I do not operate: I treat such cases by the Ochsner method, supplemented by proctoclysis as practised by Murphy. As soon as a well-localized area of rigidity and tenderness is well marked, and the evidence of peritoneal irritation has practically subsided, operation offers a much greater percentage of recoveries than in the stage immediately preceding this condition."

How is the localized appendicular abscess to be treated? Shall we open all abscesses extraperitoneally, if possible, and shall we remove all appendices at the primary operation, or only if they are easily found without disturbing the abscess wall? Or shall we open freely and boldly into the general abdominal cavity, pack off the intestines, open the abscess, mop out the pus, free the adhesion, and remove the appendix? There is an increasing tendency to follow the latter practice. Van Buren Knott[13] reports that he has used this method in 162 cases of appendicular abscess, sharply localized, with two deaths, a mortality of 1·4 per cent, and states that his results have been infinitely better than those secured under the former plan of treatment, in which the appendix was allowed to remain undisturbed in a large number of cases. Rowland[14] asserts that this is the better method, although it may seem at first sight to be more risky. On this point McWilliams remarks that the incision of abscesses alone, without the removal of the appendices, has not proved very satisfactory. Haggard, in the article quoted above, says: "There are a great many delayed cases in my section of the country, and we operate on these simply by incision and drainage. We do not bother about the appendix, and *all the patients recover.*" We do not get such results in New York, for of 60 cases simply drained, 14 died, a mortality of 23 per cent of cases so treated. I may say, however, that a number of these cases were operated on in the presence of general peritonitis in which the incision was a *dernier ressort.* It seems clear that opening an abscess intraperitoneally under proper conditions is not so dangerous as might be supposed. The majority of surgeons, however, are not yet convinced of the wisdom of this method, especially in those cases in which a large abscess has become widely adherent to the abdominal wall.

MacLaren[15] strongly advocates rectal drainage for pelvic abscess in males. The incision is made with long sharp-pointed scissors used as a dilator under guidance of the eye. A winged rubber tube is inserted and allowed to remain for several days.

Guleke[16] reports a case of almost fatal hæmorrhage from the bed of a retrocolic appendix, requiring re-operation and tamponnade.

References.—[1]*Berl. klin. Woch.*, Jan. 31, 1910; [2]*Ann. Surg.* June, 1910; [3]*Pract.* June, 1910; [4]*Med. Obozr.* 1909, lxxi. in *Sem. Méd.* Feb. 9, 1910; [5]*N.Y. Med. Jour.* Jan. 22, 1910; [6]*Ann. Surg.* June, 1910; [7]*Berl. klin. Woch.* Jan. 10, 1910; [8]*Jour. Surg. Gyn. and Obst.* June, 1908; [9]*Ann. Surg.* Dec. 1909; [10]*Jour. Amer. Med. Assoc.* Jan. 1, 1910, p. 4; [11]*Ibid.* p. 10; [12]*Ibid.* p. 10; [13]*Ibid.* July 30, 1910; [14]*Brit. Med. Jour.* Mar. 12, 1910; [15]*Jour. Amer. Med. Assoc.* June 25, 1910; [16]*Deut. med. Woch.* Mar. 31, 1910.

ARTERIES. (*See* Blood-pressure.)

ARTERIES, SURGERY OF. (*See* also Aneurysm.)

J. Vanverts, M.D., Lille.

A.—Contusion and Rupture of Arteries.

In arterial pathology these two terms, "contusion" and "rupture," mean the same thing. It is a definitely established fact that the lesions caused by contusion of arteries amount to nothing other than more or less complete rupture, varying from a mere fraying of the intima up to total division of the vessel.[1] The consequent changes vary according to the degree of injury; in complete rupture, involving all the three layers, blood is poured out around the vessel, forming a false aneurysm (hæmatomata); in incomplete rupture, implicating one of the two inner coats, thrombosis occurs at the point of injury to the arterial wall.

1. *Complete Rupture.*—The blood poured out around the injured vessel compresses the neighbouring arterial branches and makes the establishment of a collateral circulation difficult or impossible. The result is grave interference with the vascularization of the tissues supplied by the damaged vessel, especially when the blood is poured out into a region such as the popliteal space, where it is pent in on every side by firm aponeuroses, and raised thereby to a maximum pressure.

To stop the hæmorrhage from the torn vessel and to get rid of the pressure exercised by the hæmatoma in the collateral branches, prompt action is necessary; the artery should be tied above the injury, or, better still, the clot should be incised and both the torn ends of the vessel ligatured (see below, "Arterial and Arterio-venous Hæmatomata").

2. *Incomplete Rupture.*—Sometimes the thrombosis which inevitably follows the rupture, and which is due to the contact of blood with surfaces stripped of endothelium, is insignificant, and escapes clinical notice. Usually it plugs the lumen of the vessel completely, and extends centrally or peripherally, even into the branches of the main trunk. This thrombosis, when it interrupts the flow of blood through the principal artery of a limb, does not usually suffice to prevent the distribution of blood to the parts supplied by the vessel; but its extension into the branches of the artery hinders the establishment of a collateral circulation, and plays an important part in the causation of gangrene. Again, detached portions of the main clot may be carried

by the blood-stream into arteries of smaller calibre, and, obstructing these, may further predispose to gangrene.

The treatment of incomplete arterial rupture, which until recent years was exclusively medical, has of late undergone transformation. First of all, removal of the clot obstructing the vessel was tried; but the thrombosis always recurred, because the changes in the injured vessel remain unaltered and reproduce clotting.[2] This method of clearing an artery obstructed by thrombosis or embolism has, moreover, never led to a good result in the various types of cases in which it has been tried;[3] in particular, a recent case of Murphy's may be mentioned.[4]

The principal objection to the extraction of clots, namely, the persistence of the arterial changes which lead to thrombosis, naturally led Stewart[5] to resect the injured segment of the artery, uniting the cut ends by circular suture. This operation did not prevent the recurrence of thrombosis and the development of gangrene. Delagénière,[6] on the other hand, seems to have used the same procedure with an appreciably good result.

A third way of treating incomplete arterial rupture is to tie the vessel below the injury. The idea is to prevent the spread of thrombosis towards the periphery, and above all to form a barrier to the carriage of emboli. Although there are not enough data to establish the value of this procedure, it seems worthy of trial.[7]

B.—Wounds of Arteries.

1. *Ligature.*—The ligature of arteries, performed under favourable conditions of asepsis to avoid the formation of extensive thrombi, is attended as a rule with good results, as the work of Monod and Vanverts[8] on the results of ligature of the great arterial trunks shows.

Fiore's[9] experimental investigations prove that ligature of the aorta immediately below the origins of the renal arteries is always fatal by reason of cardiac over-strain and changes in the kidneys, although the subject may survive if a lower portion of the vessel is concerned. A similar conclusion is arrived at by Guinard,[10] who finds ligature above the renal arteries incompatible with life, because it cuts off from the kidneys a blood-pressure sufficient for the maintenance of their functions.

Ligation of the common carotid artery, which most authors still consider a proceeding of some gravity, is regarded otherwise by De Fourmestraux,[11] and as being usually attended by good results. His view is that the untoward consequences which have been observed are due to sepsis, and ought therefore to be avoided; occasionally they are due to lesions of the cerebral vessels or to cardio-vascular affections.

The investigations of Vanverts and Looten[12] show that, in its lower part, the *axillary artery* is possessed of slender collateral channels only. However, contrary to what has been upheld, these channels are adequate for re-establishment of the circulation after ligature of that part of the artery which has been wrongly regarded as a danger zone.

2. *Suture of Arteries.*—The records of arterial suture, increasing in number, demonstrate the general value of this method of treating wounds of arteries, whether merely lateral or completely circumferential. The cases of lateral suture number 66, 65 of which were successful, the one failure being due to erysipelas followed by hæmorrhage; there are 20 cases of circular suture, 16 successful, 3 unsuccessful, and 1 fatal.[13]

In spite of the advantages of suture, which ought in theory to make the restoration of the continuity of the vessel a matter of certainty, there is no doubt that it ought to be preferred to ligature in exceptional cases only. In fact, to secure good results, it is essential that the arterial wall be healthy and the operation absolutely free from sepsis. It is, moreover, certain that suture, naturally a more delicate procedure than ligature, should be reserved for important arteries whose ligature involves danger from the point of view of the tissues supplied. In such cases it possesses undeniable advantages. Even if thrombosis should develop at the point of suture, the artery is obstructed gradually, and thus the establishment of a collateral circulation takes place better than in the case of a sudden ligature (Enderlen[14]). A case observed by Braun[15] shows that circumferential suture of the aorta is possible. This vessel had previously been stitched laterally and with success by Bérard and Cavaillon.[16]

3. *Transplantation and Vascular Grafts.*—When an arterial wound is accompanied by loss of substance, whether lateral or circumferential, of some importance, if the continuity of the vessel is to be restored it must be done by filling the gap with grafts, by vascular transplantation. These grafts may consist of a portion of artery, which can be kept alive for weeks or even months (Carrel[17]). They may also be borrowed from a vein; the segment of vein thus transplanted soon becomes arterialized (Fischer and Schmieden[18]). Finally, peritoneum has been used in the form of a tube applied to the outer aspect of a lateral breach in the arterial wall (Carrel and Guthrie[19]).

C.—Arterio-Venous Anastomosis.

The anastomosis of an artery with a vein is usually designed to ensure a supply of blood to the capillaries through veins when obstruction of a large artery leads to ischæmia of the tissues fed through it.

That it is possible to make a functionally active communication between an artery and a vein is proved by many experiments, and especially by those recorded quite recently by Frouin.[20] The examination of twenty-six clinical records, collected by Monod and Vanverts,[21] leads to the same conclusion, but also shows that thrombosis often occurs at the point of anastomosis or in the neighbouring parts of artery and vein. Often this is due to failure in operative asepsis; sometimes also to arteriosclerotic lesions which predispose to clotting, and which are often met with in patients submitted to this operation.

Granted that anastomosis has been established, whether laterally or end to end, can blood circulate centrifugally through veins? The

experiments of Carrel and Guthrie,[22] Tuffier, Frouin,[20] Cottard and Villandre[23] show that such a reversal of the circulation can take place. Besides, some good results obtained in the human subject seem in in favour of this possibility; for example, the cases recorded by Celesia[24] and Goldberg show that benefit may accrue from the practice of arterio-venous anastomosis. But the value of this operation is seriously diminished by the great number of failures. Further, it must be asked if arterio-venous anastomosis does not incur certain risks, whether by delaying amputation (to which the progress of gangrene nearly always leads in such cases) or by the possibility of embolism.

The conclusion to which one is impelled[21] is that arterio-venous anastomosis ought not to be set aside at once in cases of atheroma with threatening gangrene, but that it is to be rejected in cases of established gangrene. (Perhaps it will find a more useful field in some cases of severe injury to a limb involving one or more of the arteries. In such a case one might join the central end of the injured vessel to the peripheral end of a neighbouring vein, as Hubert[25] has attempted.)

D.—Arterial Aneurysms.

Monod and Vanverts,[26] from a study of 410 recently recorded cases of operation for aneurysm, came to the following conclusions :—

1. Compression of the vessel on the proximal side of the aneurysm (a procedure nowadays rarely used—4·6 per cent) is to be rejected as untrustworthy (58 per cent of failures).

2. Proximal ligature yields a cure in very many cases (74 per cent); but failure is frequent (12 per cent), and gangrene of the parts supplied occurs fairly often after it (6·5 per cent). The failures are due to the fact that proximal ligature does not always cut off the circulation through the sac; blood gets into it afresh by collateral or retrograde channels, and prevents cure. The gangrene is caused by emboli detached from the sac by the continued flow of blood through it. It must be added that the "cures" which follow ligature are not always perfect; nervous symptoms and paresis may result from the intimate association (adhesion, inclusion) between the wall of the sac which is spared and the nerves of the part.

3. Extirpation of the sac is to be preferred to ligation; it yields a higher percentage of cures (90 per cent), is but rarely followed by gangrene (4 per cent), and there are no failures. For these reasons it should be practised whenever possible. To avoid the supervention of gangrene, the pulse on the distal side of the aneurysm must always be examined; if it be feeble, the conclusion is that the blood finds some difficulty in getting through the sac, and that therefore a collateral circulation has already been established which will ensure adequate nutrition of the parts supplied; if, on the other hand, the pulse is as powerful on the peripheral as on the central side of the sac, a contrary conclusion is arrived at, especially in cases with forcible pulsation and a loud murmur at the edge of the sac, and the formation of a

collateral circulation must be encouraged by digital compression of the artery for days, or even weeks, beforehand.

4. Whenever extirpation is impossible the sac should be incised; this assures a cure, but is inconvenient in that it leaves the sac, to which nerves are often adherent.

5. Obliterative aneurysmorrhaphy offers no advantages over extirpation, and moreover introduces the risk of gangrene.

6. Conservative operations for aneurysm, whether performed on the lines of restorative or reconstructive aneurysmorrhaphy, or whether they include extirpation of the sac followed by restoration of the continuity of the artery by circular suture or grafting, seem in theory to be preferable to extirpation; but the records are too few to allow of an opinion as to their value. Besides, in the great majority of cases the relations of the sac, or the co-existence of arteriosclerosis, render such proceedings impracticable.

7. In cases of aneurysms out of the reach of direct treatment (such as those of the transverse aorta) recourse may be had, with some chance of success, to the introduction of metal wire into the sac, through which an electric current may be sent.

Aorta.—The extirpation of an aneurysm of the transverse aortic arch was fatal in Villard's[27] case, as in the earlier one treated by Tuffier. Distal ligature, tried by Guinard[28] in the same type of case, ended in the same way.

Common Carotid.—As to gravity, there is not much to choose between proximal ligature and extirpation,[29] but the latter promises a more certain cure. The removal of an aneurysmal sac from the neck may, however, present such serious difficulties that it must be given up altogether, if the aneurysm be situated too low down, or a partial extirpation only be attempted. It is well to begin where possible with distal ligature, to prevent embolism in the course of the isolation of the sac, an accident of special danger in this situation.

Innominate.[30]—The method of choice is simultaneous ligature of the common carotid artery with the subclavian or axillary;[31] in 77 recent cases this has yielded a mortality of 14 per cent, temporary improvement in 57 per cent, failure in 19 per cent. The carotid ought always to be tied first, lest the backwash which may occur within the sac when the subclavian artery is tied should carry an embolus into the carotid artery, with fatal results.

Subclavian.—Aneurysms of the third part of the subclavian artery call for extirpation and for proximal ligature. Ligature should be done first, and extirpation afterwards, if it prove feasible. For aneurysms arising internal to the scalenus anticus muscle, it is best to stick to ligature by Brasdor's method, as Anel's method is much more dangerous.

Gluteal and Sciatic Arteries.[30]—For intrapelvic aneurysms, ligature of the internal iliac artery must be undertaken, as it gives excellent results. For extra-pelvic aneurysms, a similar procedure has yielded many successful results, while incision of the sac has often been followed

by death from hæmorrhage. However, since incision is preferable to ligature, this danger can and should be avoided by preliminary compression of the internal iliac artery, either by temporary means or even by ligature.

E.—Arterio-venous Aneurysms.[26, 32]

Quadruple ligature, incision, and extirpation are the three methods between which until quite recently the choice of the surgeon seemed to lie. However, contrary to the happenings of former days, cases of direct attack upon the sac by incision or extirpation have become much more frequent (117 cases) than those of quadruple ligature (15 cases). The reason for this preference lies in the infinitely greater probability of gangrene after quadruple ligature (20 per cent) than after incision or extirpation (1·7 per cent). Cure is much more likely after radical treatment (95 per cent) than after quadruple ligature (60 per cent). Van Oppel[33] showed that the one thing essential to the cure of an arterio-venous aneurysm was complete separation of the arterial and venous circulations, an achievement which is not possible by means of quadruple ligature, while either incision or extirpation makes sure of it. In these days an endeavour is being made to cure arterio-venous aneurysms, while preserving the permeability in one or other of the vessels concerned. It is impossible to give a definite opinion as to the value of these conservative procedures.

F.—Arterial and Arterio-venous Hæmatomata.

Monod and Vanverts[34] insist on the necessity, from the therapeutic point of view as well as from that of morbid anatomy and pathogenesis, for distinction between true arterial and arterio-venous aneurysms, and arterial and arterio-venous hæmatomata or false aneurysms. The title "aneurysm" should be reserved for true aneurysms, in which the lesion originates in the dilatation of a vessel. False aneurysms, which consist of an effusion of blood consequent on injury of an artery or a vein, ought to be spoken of as "hæmatomata," arterial when the blood comes from an artery only, arterio-venous when the causal injury implicates an artery and a vein together.

Of 200 recent cases of hæmatoma, 70 per cent were treated by incision and ligature of the two ends of the damaged vessel, while in 30 per cent the artery was tied above and below the injury, or above only. A comparison of the results achieved by the two methods shows the undeniable superiority of incision, both from the point of view of the number of successes and of the failures. Gangrene and mortality came to much the same rate in both instances.

To avoid the accident of hæmorrhage which has sometimes occurred during incision, preliminary hæmostasis must always be secured, except in those cases where it is impossible.

To avoid gangrene, it is wise to test the capacity of the collateral circulation to nourish the parts supplied by compression of the artery above the hæmatoma. If the pulse persists, or is but little diminished

after this compression, we may feel re-assured as to the development of a collateral circulation and as to the propriety of ligature above or at the point of incision. If, on the other hand, the pulse disappears, it is because the collateral circulation is less settled, and its development must be encouraged by repeated compression of the artery above the hæmatoma. Also in cases with deficient collateral circulation, recourse may be had to the suture of vessels, which has given many encouraging results.

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ARTERIOSCLEROSIS. *Carey F. Coombs, M.D., M.R.C.P.*

ETIOLOGY AND PATHOLOGY.—Adami's[1] article on the nature of the arteriosclerotic process is a perfect example of what such an article should be. He considers, first, the various morbid states of the arteries which are included within the term arteriosclerosis ; of these there are three, the nodose or atheromatous, the diffuse, and the syphilitic. Both of the two first types occur together in senile vessels ; and all the types differ a little in the form which they assume when attacking the aorta and its larger branches from that met with in the smaller arteries ; in the latter the media is relatively more affected and calcification is less marked. The relationship between the different parts of the arteriosclerotic process is exemplified most clearly by the syphilitic type, and the explanation arrived at by considering this will bear application to the nodular and diffuse types. Syphilitic arteritis develops in stages. First, the arterial wall is invaded through its vasa vasorum by spirochætes ; this leads to a patchy mesarteritis, with degeneration and cellular infiltration of the media, which is thus weakened, so that extra strain is thrown on the intima and adventitia. These structures try to compensate by overgrowth for the failure of the media. Similarly in senile arteriosclerosis it is the media that goes first ; indeed, atrophy of the medial muscle begins normally at the age of thirty-five, though it is not well marked till fifty. Fatty change in

this instance is followed either by calcification or by mere atrophy of the media, patchy in either case, and succeeded by a correspondingly patchy overgrowth of intima and adventitia. The absence of intimal hypertrophy in the arterial changes which follow adrenalin injection is due, he thinks, to the acuteness of those changes ; and he points out that in rabbits hung upside down, intimal changes do develop in those vessels which are thus over-strained. Osler[2] describes the causation of arteriosclerosis by referring it to "time, tension, and toxins." Under the head of "tension" is included muscular over-work, and general high-speed living ; while the toxins may be endogenous, such as may arise from over-eating, or exogenous, such as tobacco, alcohol, and the bacterial toxins.

Symptomatology.—Kreuzfuchs[3] divides cases with symptoms of abdominal arteriosclerosis into four groups : (1) Patients with cardiac and general arteriosclerosis, who have paroxysms of abdominal pain and meteorism. (2) Patients in whom pectoral and abdominal angina alternate. (3) Patients with arteriosclerosis and some superimposed abdominal affection such as duodenal ulcer. (4) A relatively obscure group of cases with abdominal but no cardiac symptoms. In either case the characteristic features of abdominal arteriosclerosis are paroxysms of epigastric or umbilical pain and meteorism. The attacks are increased on lying down, but they are independent of food. There is often constipation, and may be hæmorrhage from the bowel. Men are affected oftener than women, the commonest age is in the fifth decade, and it seems that tobacco plays a part in the causation.

Greig,[4] in commenting on the case of a man of seventy-two, in whom crural venous thrombosis was associated with *intermittent limp*, gives it as his opinion that this symptom may be provoked by interference with the passage of blood from, as well as to, the affected muscles, and that it is therefore not infallibly a symptom of arteriosclerosis.

Treatment.—Franze[5] recommends, as general treatment, gentle **Massage,** with **Passive Movements,** and **Carbon Dioxide Baths.** He reduces, but does not entirely forbid, meat, and advises a diet consisting chiefly of milk, vegetables (which should be steamed and not boiled), fruit, honey, and oatmeal. He is in favour of giving **Curdled Milk.** As for drugs, he believes in **Iodides** ; either sodium or potassium iodide may be given in doses of 5 gr. three times a day, two weeks on and two weeks off, for a period of years. Merck's **Iodipin** and **Saiodin** are also useful, the latter in $7\frac{1}{2}$-gr. doses after breakfast and after the evening meal. Tablets of "**Trunecek's Serum**" are also recommended ; these, which consist of the normal salts of the blood so proportioned as to imitate the mineral content of human serum, contain the sulphate, chloride, carbonate, and phosphate of sodium, magnesium phosphate, and calcium glycerophosphate. Two should be given in half a tumbler of water three times daily one hour before food, for one month at a time, followed by two weeks' interval. It should be remembered that they take one or two hours to dissolve. Crofton[6] describes a case of recovery from arteriosclerosis under treatment with the same

tablets, in addition to **Miol, Brine Baths,** and a morning **Saline.** Brown[7] advises **Potassium Iodide** in doses of 10 to 60 gr. thrice daily; if the stomach refuses to bear these large doses, **Iodipin** may be given instead by intramuscular or hypodermic injection, in doses of 15 to 150 min. every second or third day. **Thyroid Extract** is recommended by the same author, especially for arteriosclerotic women. Another form of iodide is highly commended by Hall,[8] namely **Eustenin,** a combination of sodium iodide with theobromine, the dose of which varies from 7½ to 12½ gr., three times daily. A somewhat remarkable suggestion is put forward by Satterthwaite,[9] who claims that treatment of arteriosclerosis by **High-frequency** will produce a lasting fall in the blood-pressure and consequent benefit. (For other methods of reducing blood-pressure, *see* BLOOD-PRESSURE.)

The *abdominal pains* already alluded to are best relieved, according to Kreuzfuchs,[3] by **Warm Moist Applications** to the abdomen; **Morphia** in cautious doses is valuable. [The writer has in such cases found **Erythrol Tetranitrate** of great value.]

For the *sleeplessness* of arteriosclerotics Aufrecht[10] gives either **Antipyrin** or **Aspirin** in 15-gr. doses, falling back on morphia if these fail.

For the use of **Iothion,** see *page* 33.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* Oct. 1909; [2]*Brit. Med. Jour.* Dec. 25, 1909; [3]*Deut. med. Woch.* Feb. 17, 1910; [4]*Pract.* Nov. 1909; [5]*Folia Therap.* Ap. 1910; [6]*Brit. Med. Jour.* Aug. 6, 1910; [7]*Jour. Amer. Med. Assoc.* Jan. 8, 1910; [8]*Med. Press,* Nov. 10, 1909; [9]*N.Y. Med. Jour.* July 2, 1910; [10]Book review in *Brit. Med. Jour.* July 2, 1910.

ARTHRITIS DEFORMANS.

Thiosinamine in (*page* 54).

ARTIFICIAL MENOPAUSE.

X-rays to produce (*page* 81).

ASTHMA. *Joseph J. Perkins, M.B., F.R.C.P.*

Melland[1] gives a very instructive account of his personal experience in the treatment of asthma. In the severer attacks he has seen, lasting, for example, three days, he has found the usual antispasmodics, e.g., lobelia, of little use. Chloral was more effective, but for some time the only means he knew sufficiently powerful to relieve spasm and give sleep was the hypodermic injection of **Morphia** gr. ¼. It should be mentioned that the fuming inhalations were of some real service—far more effectual than the action of the same drugs given by the mouth. The smoke of burning **Stramonium** contains the alkaloids atropine, hyoscyamine, and hyoscine, so that the relief given by this means is not unnatural. A spray of atropine does good, but in greater strength than a half per cent its use requires caution.

The paper is chiefly devoted to a discussion on the efficacy of **Adrenalin** used hypodermically, and its action is really little less than marvellous. In the first case in which its use is described there was a previous history of hay fever, and a spray of adrenalin 1–4000 had given some

little ease. During a very severe attack of asthma 10 min. of 1–1000 were injected, with relief described as instantaneous. The singing sounds in the chest ceased, and the feeling of oppression at once passed away. More remarkable still, the asthmatic attacks, which had previously occurred nightly, remained in abeyance for seven nights. In the next attack the effect of the injection was equally marked. Later 6 min. were given every night, and after four or five weeks of this treatment the incidence was so much diminished that in the following three months only seven attacks occurred. In the second case described, morphia gr. $\frac{1}{4}$ was given in a severe attack with little or no relief fifteen minutes later; 8 min. of adrenalin (1–1000) were then injected, with immediate ease. In a third case 5 min. were sufficient. It is to be noted that given by the mouth even 15 min. failed to produce dilatation of the pupil and had no effect on the asthma.

Besides being used for relief at the moment, the adrenalin may be given during the day as a prophylactic against the nightly attacks. Its effect is probably due to its inhibiting or relaxing the circular muscles of the bronchi rather than to any vascular control, for though the bronchial arteries have a vasomotor supply, the pulmonary arteries have none.

Craufurd Matthews[2] also bears testimony to the value of adrenalin, used, however, in his cases as a nasal spray of 1–2000 or 1–1000, though in most of the patients so treated there was no nasal trouble. Relief followed in a few minutes, even in attacks which had resisted all other treatment for several hours. (See also *page* 1.)

H. Campbell[3] discusses preventive treatment between the attacks rather than relief at the moment, and lays especial stress on **Diet,** though he finds **Respiratory Exercises** and **Massage** of value also. The diet he advocates follows Harc's views, and is mainly animal, starch, sugar and fat being curtailed. He quotes an illustrative case in which the weight was reduced by 2 st. 3 lb. in six months with great benefit to the asthmatic attacks. The patient in this instance was corpulent, and the diet, which at first did not exceed a total of six ounces of solids in the day (three of bread, three of meat), excepting green vegetables, was reduced finally to one ounce of bread and two of meat, a little weak China tea and 10 oz. of milk being also allowed.

Tivy[4] finds that a full dose of **Calomel** is of great value as a preventive.

Hertz,[5] himself a sufferer from the disease, speaks highly of **Arsenic** in the intervals between the attacks. As to diet, he advises moderation but no special limitations.

For the employment of **Iothion,** see *page* 33.

REFERENCES.—[1]*Lancet,* May 21, 1910; [2]*Brit. Med. Jour.* Feb. 19, 1910; [3]*Clin. Jour.* Jan. 5, 1910; [4]*Brit. Med. Jour.* Sept. 25, 1909; [5]*Clin. Jour.* July 6, 1910.

AURAL VERTIGO.

Electricity in (*page* 93).

BANTI'S DISEASE. (*See* SPLEEN.)

BERI-BERI. *J. W. W. Stephens, M.D.*

The work of H. Fraser and A. T. Stanton[1] is reviewed in the *Indian Medical Gazette* for June, 1910. It is pointed out that beri-beri does not follow the use of rice prepared in the Bengal method, i.e., by first soaking the *paddy* in water and boiling it, and then sun-drying it. This parboiled rice is then *roughly* husked, but a large amount of the pericarp, or inner sheath, is still retained; such rice is brownish or red in colour. Beri-beri, on the contrary, is occasionally associated with the use of clean-looking white rice from Rangoon, and more especially with rice from Siam and the Further East. This rice is characterized by its brilliant whiteness, due to the fact that the pericarp and subjacent layers have been removed by polishing. Parboiling renders the rice grains tough, and portions of the pericarp still remain after husking. The authors then established that this white rice administered to fowls produced a polyneuritis, and that fowls could be used as an indicator of the beri-beri-giving properties of a rice. Now parboiled rice has no effect on fowls, but if such rice is extracted with alcohol, and then carefully dried, it produces polyneuritis; therefore the alcohol has removed some substance which prevents the rice producing polyneuritis. Further, a white rice that is known to produce polyneuritis in fowls can be rendered innocuous by adding to it some of this alcoholic extract, and in fact, also, by adding to it the polishings from the mill obtained in the process of preparing white rice. It appears, therefore, that beri-beri is due to a nutritive defect in some kinds of rice, caused by the processes of milling. The authors, from a chemical analysis, conclude that this defect is a lack of phosphorus. The prevention of beri-beri, if these conclusions be true, lies in avoiding white rice or, if this is used, in the addition to it of the polishings.

REFERENCE.—[1]*An Enquiry into the Etiology of Beri-beri.* By H. Fraser and A. T. Stanton, Singapore. (Kelly and Walsh, Ltd., 1909, Price 3s. 6d.)

BILHARZIA. (*See* SCHISTOSOMIASIS.)

BILIARY TRACT, SURGERY OF.

John B. Deaver, M.D., LL.D.
D. B. Pfeiffer, A.B., M.D., } *Philadelphia.*

Just as it seemed that the entire profession had been united in agreement with Naunyn's views as to the infective origin of gall-stones, comes an extensive and important contribution to the study of cholelithiasis by Aschoff and Bacmeister.[1] These authors assert that stasis is an essential cause of cholelithiasis. Pregnancy, kinks, or anomalies of form or situation of the liver, visceral ptoses, etc., may give rise to the "vesicle of stasis," (Stauungsgallenblase). Such a gall-bladder is larger than normal, and its walls are opaque. In it there may form a pure cholesterin stone, single, round, translucent in its peripheral zone, and showing no stratification. This variety of calculus does not require previous microbic activity, but, according to Aschoff and

Bacmeister, is due to precipitation of cholesterin about an amorphous centre, as in a reaction in vitro. The cholesterin, which is derived by Naunyn from desquamation of the vesical epithelium, is, according to Aschoff and Bacmeister, a fundamental constituent of bile. They believe that its amount depends upon the alimentary regimen, and that nutritional troubles may augment that amount. They state that its precipitation may be caused, not only by bacteria, as is well known, but also by the addition of sterilized epithelium to sterile filtered bile. Their conclusions follow : " We find the pure cholesterin calculus in the vesicle of stasis without inflammation. The morphology of this calculus shows that it is derived by a slow crystallization in situ at the expense of the bile. The chemical structure of the calculus corresponds to the constitution of the normal non-infected bile. The constituent parts of the calculus may be derived from the normal bile, without infection, by simple decomposition. The pure cholesterin calculus is in general solitary. Secondary infection may develop in a gall-bladder containing a calculus. The structure of its shell may be changed by addition of layers of different composition."

The authors admit the frequent origin of gall-stones as a result of infection, but insist upon the correctness of their observations as indicating the occurrence of a non-infectious lithiasis which often precedes, and may predispose to, infection. The importance of this theory is evident, as, if true, it indicates the necessity of learning to suspect the early stage of stasis and slow crystallization at a time when by prophylactic means the tendency may be checked. It may be as well to observe that the authors, while making out a good case, by no means dispose of the objections to their theory, and it is likely that clinicians will not be greatly moved from their present beliefs until more convincing proof is forthcoming.

From the Mayo clinic MacCarthy[2] issues a paper concerning the pathology of the gall-bladder, based upon 365 cases of cholecystectomy, in which the various pathological lesions are arranged under a rather complicated series of groups, with a view to making it clear " that the pathology of the gall-bladder reduces itself, not to definite pathological lesions, but to stages in a pathological process, which consists of an infection of the mucosa of the gall-bladder, the common or cystic ducts." MacCarthy finds no evidence for, and makes no note of the likelihood of, any of his cases being examples of non-infective conditions. Especial attention is drawn to the fact that in nine cases of carcinoma of the gall-bladder the average duration of symptoms was 19·4 years, strongly pointing to the probability of chronic irritation being responsible for the development of malignancy. A brief clinical summary of statistical interest is appended to the paper.

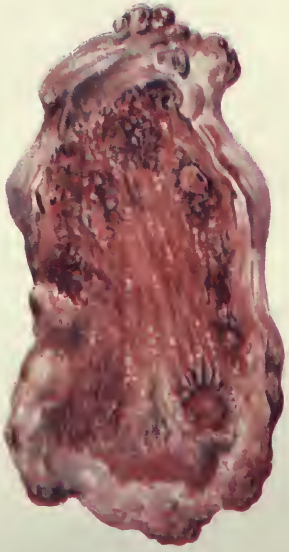
Moynihan[3] draws attention to an interesting condition which necessitates cholecystectomy, namely, the occasional presence of innumerable minute stones so deeply imbedded in the mucosa as to defy extraction. No extended note has previously been made of this condition, though Deaver[8] had observed and commented upon such

PLATE XIV.

GALL-BLADDERS

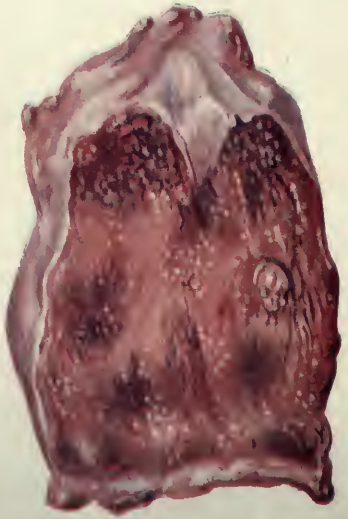
WITH NUMBERLESS MINUTE STONES EMBEDDED IN THEIR WALLS. (Mr. MOYNIHAN'S CASES).

Drawn by Ethel M. Wright.



CASE 1.—Gall-bladder almost normal in appearance from without; the mucosa is studded with fine grains of cholesterin stones.

CASE 2.—Gall-bladder, much thickened. Advanced cholecystitis. No stones other than the fine sandy deposit ingrained in mucosa.



CASE 3.—Cholecystitis only present at the fundus; the remainder of the gall-bladder quite healthy.

cases. Moynihan's excellent description follows: "Briefly, the history is one in which there has been a period of 'indigestion,' lasting always for months, sometimes for years. There have been discomfort, a sense of weight, fullness, or distention after meals, and heartburn or acidity, and in consequence the diet may have been much restricted. At intervals, 'attacks' of pain occur, attacks which are usually severe, sometimes agonizing, and may be attended by shivering. The pain in all its attributes is exactly that described as 'hepatic colic,' and a faint tinge of jaundice may follow; after an attack, the gall-bladder may be palpable, and for some days a sense of soreness and of stiffness may be felt in the side. On such evidence, a confident and most reasonable diagnosis of gall-stones may be made. When the abdomen is opened the gall-bladder may appear to be quite healthy (*Plate XIV*): in one of my cases it was absolutely normal in appearance; it had the blueness of health, and the gland by the side of the cystic duct was not enlarged. In this case, as in all, the bile was found to flow with difficulty when a needle was thrust into the gall-bladder. The bile is thick, dark in colour, tenacious, and often sticky. It may be like a thick solution of rubber; it is tarry and black. As it flows on to a swab the sparkle of cholesterin crystals may be seen. It is at this point that the mistake may be made of completing the operation by inserting a tube into the gall-bladder and in being content with drainage. If now the interior of the gall-bladder be inspected, a curious appearance is presented. The whole of the mucosa is thickly dusted with fine stones: the stones are numberless, of small size, and they fit snugly into the pits on the reticulated surface of the mucous membrane. The fine calculi are indeed embedded in the wall; they cannot be brushed away, and scraping the surface with a spoon or with dry gauze does nothing to move them. The coarse particles of grit are ingrained. When the whole interior is displayed, it is seen that the number and the size of the fine stones increase as the cystic duct is approached; at the beginning of the duct they stop abruptly in a perfectly straight line. The mucosa of the duct itself is usually intact, smooth, and free from all trace of grit. The wall of the gall-bladder itself may appear normal, it may be thickened at the fundus, and normal elsewhere, it may be white and slightly thickened, or finally, it may be dense, thick, opaque, with a cavity much reduced in size. I have met with every grade of cholecystitis, from the mildest to the very severe. The most common condition is to find the gall-bladder almost normal, retaining much of its natural blue colour, and all of its smoothness and suppleness. These are the cases it is most essential to recognize, for in them also the removal of the gall-bladder is the only course of treatment likely to be attended by lasting success."

Jaundice as a symptom, its diagnosis and treatment, are considered by those two masters of surgery of the biliary tract, Moynihan[4] and Hans Kehr.[5] As a text for his remarks Kehr takes his operations upon the biliary tract during the preceding year, 125 in all. Of these, 45 showed chronic jaundice, in 26 cases due to stone, in 4 to stricture

of the common duct, in 2 to carcinoma of the same, and in 3 to pancreatitis.

For the practitioner, in dealing with chronic jaundice, the chief point to decide is, first, whether the jaundice is due to stone on the one hand, or to a catarrhal condition or tumour formation on the other. With a parenthetical warning that stones may occasionally find their way into the choledochus without causing pain, it is stated that the onset of jaundice with colic or cramps is practically decisive in favour of stone. If, on the contrary, the jaundice is painless, it is, at first, impossible to determine whether it be catarrhal or due to a more serious condition. Concerning the causation of catarrhal jaundice, Kehr states his opinion, based on observations at operation, that in many instances this is due to swelling of the head of the pancreas rather than to duodenal catarrh. The claim that pancreatic inflammation is associated with distress in the upper abdomen, while duodenal catarrh is painless, he is unable to verify. In the painless jaundice of unknown origin, Kehr advises a guarded prognosis and a preliminary period of treatment of six weeks. If loss of appetite and bodily strength is then observed, operation is to be done. In that period simple catarrhal jaundice is generally recognized, while a longer delay in the case of cancer will frequently permit an incurable extension of a growth. Jaundice due to stone is to be treated by similar delay, since the stone may be discharged spontaneously. If, however, the condition lingers, fever appears, and the bodily powers are diminishing, operation is to be advised without delay.

If the cases of subacute obstruction are difficult of decision, those of chronic choledochus obstruction, with its well-known train of symptoms, give no difficulty either in diagnosis or of decision as to treatment. Changeable jaundice is characteristic of stone in the common duct. On the contrary, that due to tumor or stricture deepens from week to week. The gall-bladder is shrunken in 70 to 80 per cent of cases of stone, and therefore not palpable. In the case of tumour, according to the well-known law of Terrier-Courvoisier, it is palpable. Exceptions are seldom seen.

Internal medication is flouted by Kehr, who advises rest in bed, careful diet, and heat or cold locally, during the preliminary period of palliation. If these means fail, early recourse should be had to surgery. This is true of stone as much as of tumour or other obstruction, since the danger of biliary cirrhosis, cholangitis, and cholæmic diathesis is great, and may annul the results of successful operation later. The fear of post-operative hæmorrhage in cases of jaundice is not justified, as in his last sixty cases only one died from this cause, and this case had carcinoma. Kehr administers calcium chloride, 2 grams three times a day for six days before operation, and ascribes good results to its use. The fear of peritonitis he also deprecates, as but one instance was encountered in his 125 cases, and here the operation was complicated by a duodenal perforation. Of the 45 cases of chronic jaundice 9 died, one from peritonitis as above stated, one from suppurative

cholangitis. Three had carcinoma, and two far-advanced biliary cirrhosis. In the majority of cases, Kehr performed cholecystectomy.

Moynihan gives an excellent systematic exposition of the diagnosis of the causes of obstructive jaundice. Three separate branches of enquiry are to be followed: (1) The clinical history; (2) The physical signs; (3) The chemical investigation of the urine and fæces. From the first the most substantial help is derived, and two chief types of obstructive jaundice are pictured, "the one beginning insidiously without pain, and going on unchecked to the deepest tinge—the 'black jaundice' of the older writers—the other beginning abruptly, and then following upon an acute and agonizing attack of pain, deepening for a time; but at length yielding, only to increase again and again, it may be, upon the recurrence of acute seizures of epigastric pain. The former type appears commonly in those who have before suffered little or no abdominal trouble, who have been free from all 'indigestion' and in robust health to the moment of the onset of jaundice, and who then rapidly waste, and lose all interest in and capacity for, their ordinary daily tasks. The latter type appears always in those who have suffered long from flatulence, indigestion, colic, and all the characteristic 'inaugural symptoms' of gall-stones.

"The conditions which may cause the first type of jaundice, due to a progressive, unremitting, and finally complete obstruction of the duct, are: (1) Carcinoma of the pancreas; (2) Carcinoma of the common hepatic, cystic, and common ducts; (3) Carcinoma of the ampulla; (4) Stricture of the common hepatic or common bile-ducts; (5) Stricture of the ampulla due to the cicatrix of a duodenal ulcer; (6) Compression of the common duct from without—for example, by the scar of a duodenal ulcer, by a large stone in the cystic duct, by enlarged glands in the portal fissure or below it; rarely by carcinoma of the stomach or duodenum. The conditions which may cause the second type of jaundice, due to an obstruction, at first perhaps complete, but soon becoming incomplete and variable, are: (1) Stone in the common hepatic or common bile-duct; (2) Chronic pancreatitis, with or without stone; (3) Hydatid cyst in the common duct; (4) Pressure from without, as in renal and other tumours."

Physical Signs.—Moynihan states that an extended enquiry found less than 10 per cent of errors in the application of Courvoisier's law. Infractions of the law are found in the following instances: "(1) When there is a stone or a stricture in the cystic duct causing hydrops or empyema, together with the acute impaction of a stone in the common duct; (2) When there is a stone in the cystic duct pressing upon the common duct; (3) When there is distention of the gall-bladder by an acute inflammatory process, with obstruction of the common duct by stone; (4) When there is chronic induration of the head of the pancreas, with a stone in the common duct; (5) When there is malignant disease of the common duct at any part of its course, or cancer of the head of the pancreas, and a chronic sclerosing cholecystitis."

Examination of the Urine and Fæces.—Considerable reliance is placed

on the Cammidge reaction of the urine as indicating the presence or absence of acute or chronic pancreatitis. It is stated that the reaction is positive also in about one-fourth of the cases of carcinoma of the pancreas, probably because of the coincidence of a zone of inflammation surrounding the cancerous area. Kehr, on the contrary, has had an unsatisfactory experience with this reaction, and attaches little importance to it. The stercobilin reaction is recommended by Moynihan, to determine whether any bile is escaping into the bowel. When the pancreas is affected, the stools are large and contain an abundance of fat. If no pancreatic juice is discharged into the intestine, the stools are clay-coloured, even if bile be present.

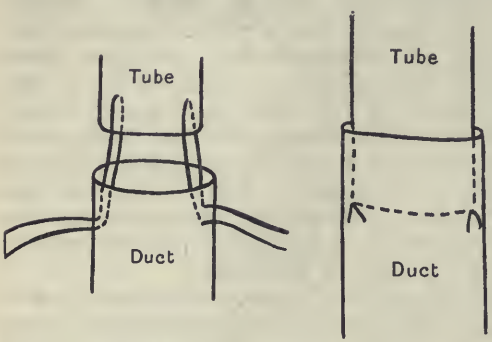


Fig. 5.—Method of suturing tube into duct.

Selection of cases for operation is to be made from a consideration of the diagnosis and prognosis, together with the physical condition of the patients.

To counteract the tendency toward hæmorrhage in cases of prolonged jaundice, Moynihan uses injections of sterilized horse serum, and quotes Munro to the same effect. While further experience in the use of alien serum injections is necessary, he thinks they are the most reliable of all methods.

Reconstruction of the Bile-ducts.—An ingenious method of reconstructing a common bile-duct has been worked out upon dogs and described by A. G. Sullivan.[6] The duct is pieced out by a rubber tube, one end of which is inserted through the duodenal wall, while the other is tied into the cut end of the duct, as shown in *Figs.* 5–7. Over the distal end of the tube the duodenal wall is overlapped for a short distance, as in the Witzel gastrostomy. The exposed portion of the tube is covered with omentum. A sponge is tied to the end of the tube which lies in the duodenum, in order that peristaltic action may pull the tube away when the channel is formed and the sutures have been absorbed. The results in eight dogs were functionally satisfactory.

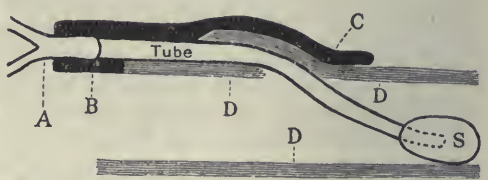


Fig. 6.—Diagram showing introduction of tube and sponge into duodenum. A, hepatic duct; B, gastrohepatic omentum; C, great omentum; D, duodenal walls; S, sponge.

Brewer[7] reports a case of obstinate biliary fistula in which a modification of the Sullivan method was employed. No trace of the choledochus

could be found. The anastomosis was therefore made by medium of the rubber tube between the hepaticus and the duodenum. Prior to the operation no bile had entered the intestine since the primary cholecystectomy seventy-five days before. Following the operation, bile reappeared in the stools, and the patient's condition returned to normal. Except for one attack of fever and jaundice, the improvement was maintained up to the time of the report two months later.

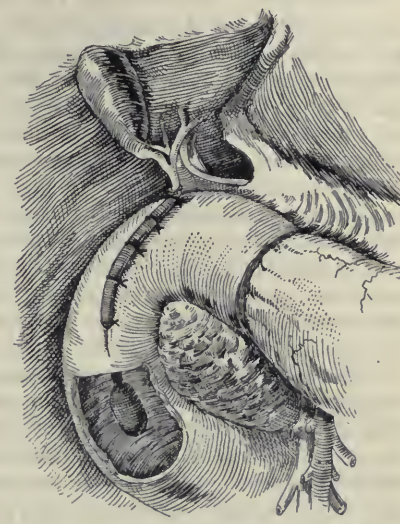


Fig. 7.—Tube sutured to duodenal walls; adapted from one of W. J. Mayo's drawings.

REFERENCES.—[1]*Die Cholelithiase*, L. Aschoff and A. Bacmeister (Jena, Gustave Fischer, 1909); [2]*Ann. Surg.* May, 1910; [3]*Ibid.* Dec. 1909; [4]*Brit. Med. Jour.* Oct. 2, 1909; [5]*Münch. med. Woch.* Nov. 30, 1909; [6]*Jour. Amer. Med. Assoc.* Sept. 4, 1909; [7]*Ann. Surg.* June, 1910; [8]*Amer. Jour. Med. Sci.* Ap. 1908.

BLACKWATER FEVER. (*See* MALARIA.)

BLADDER, SURGERY OF THE. *E. Hurry Fenwick, F.R.C.S.*

The exact method of judiciously treating bladder growth, benign or malignant, is still unsettled. One group of surgeons invariably attack the benign group through the ordinary suprapubic incision, and have neither difficulty with hæmorrhage nor anxiety concerning infection of the prevesical space. The recoveries are sound by this route, and, if there is no decided malignancy and the removal has been thorough, recurrence does not often occur under three years. But the disease does recur in most cases, and this has forced another group of surgeons to be still more thorough in the removal of the original growth, and to effect this the transperitoneal route has been advocated both for benign and malignant growths. The suggestion of this method of attack dates in the literature apparently from F. B. Harrington,[1] in 1893. This route has been more strikingly illustrated and more strongly advocated by Charles H. Mayo.[2] The abdomen is entered above the pubes, and the bladder opened by a vertical incision through its peritoneal covering. The tumour is removed, and subsequently the wound in the bladder is sutured. Five cases have been operated upon by Mayo for papillomatous growths, without mortality; three of these tumours were carcinomatous, and the others benign.

Judd[3] enters very fully into the matter of the transperitoneal

attack, and in addition his work is supported by the evidence of end results. He writes thus :—

" Profiting by the knowledge that the bladder has been accidentally opened many times during abdominal operations, and that the kidneys and ureters have often been exposed through a peritoneal incision without serious consequences to the peritoneum, we determined to open the peritoneal cavity deliberately and pack off the intestines and omentum, preparing this area of the peritoneal cavity in a manner similar to that for resection of any organ.

" The patient is placed in the high Trendelenburg position, and on opening the abdomen an opportunity is afforded for exploring the liver, pelvic peritoneum, and lymphatics. Although we have never seen an extensive involvement of the lymphatics, in one case a metastasis had already occurred in the liver, and in another the pelvic peritoneum was involved, so that an intravesical operation would have been useless and harmful.

" The intestines and omentum are packed into the upper abdomen with several large gauze pads, the packing covering the abdominal wound. The posterior bladder wall is grasped with tenaculum forceps, one on either side of the median line, and the bladder lifted into the abdominal incision. A longitudinal incision is made in the posterior wall of the bladder, beginning on its peritoneal surface in the mid-line and extending well back to the base of the bladder. The urine is sponged from the bladder as soon as it is opened. This should be done carefully, to avoid starting a troublesome oozing. If the tumour is on a pedicle, this may be grasped by a pair of curved hæmostats and excised with a cautery, leaving the cauterized surface to granulate. The area removed should include a portion of the healthy mucosa and submucosa. When the tumour has an indurated base, it will be necessary to excise a portion of all the coats. At times, as much as one-half of the bladder must be removed. It is essential to preserve as much as possible of the healthy tissue about the urethral orifice. If the bladder is involved at the ureteral opening, after the diseased portion of the viscus is removed, the ureter is divided near the bladder and drawn into the abdomen through a perforation in the peritoneum close to the remaining half of the bladder, into which it is passed, and to which it is attached with catgut sutures. The peritoneum is closed over the exposed ureter in a fold to insure rapid healing. The remainder of the bladder is closed, and, though greatly reduced in size, will be serviceable, and its capacity will tend to increase (Harris[4]).

" Having completed the intravesical part of the operation, the same technique is employed in closing the wound in the bladder as could be used in repairing a wound in the intestines or stomach. The first row of sutures begins and ends with the knot inside. These are of chromic catgut placed as a running mattress or Connell stitch, including all the coats. The mucous edges are turned in, not only making an air-tight and water-tight closure, but also controlling all

bleeding from the edges. This suture-line is reinforced by a linen stitch, including the peritoneum, put in parallel to the previous suture-line.

"It is not necessary to drain the peritoneum or the bladder unless the growth involves the ureteral opening, or unless the prostate is removed, when it is best to establish an independent drainage through the space of Retzius after the bladder has been closed. As a rule these patients void their urine frequently the first few days, and are more comfortable without a catheter, though if spasmodic contraction persists in the bladder, patients will be made more comfortable by small washings of warm boric-acid solution to rid them of clots.

"Employing this plan of procedure and technique, we have now operated in fifteen cases of tumours of the bladder, with one death. In this case the patient was a man, seventy-one years of age, in whom the carcinoma involved nearly one-half of the bladder, including the left ureteral meatus. One-half of the bladder and the lower end of the ureter, which was greatly dilated, were removed. The excision included all the coats of the bladder wall. The end of the ureter was sutured into the remaining half of the bladder, and the bladder closed entirely. The patient voided urine freely and without aid for the first few days; then the amount gradually diminished; he became uræmic, and died at the end of the first week. There had been no leakage from the suture-line or transplanted ureter, and the peritoneum was clean. The left kidney showed an old hydronephrosis, with destruction of almost the entire parenchyma, and the right kidney was swollen and congested from an acute nephritis.

"One patient, who had slight involvement of the pelvic peritoneum at the time of operation, died in three months of a recurrence in the peritoneum.

"Six patients have lived over one year with no evidence of a return of the trouble. All except two of these patients (one complaining of frequency and one having a stricture which necessitated secondary operation) have been comfortable and apparently well.

"One patient has been well ten months, one nine months, one five months, and one one month. In the last case nearly one-half of the bladder was removed and the right ureter transplanted into the left half of the bladder. Since one week after operation, the patient has passed clear urine. At first he voided very frequently, but the intervals gradually increased, and at the end of one month he averaged once or twice each night.

"One patient with malignant papilloma returned in eighteen months, showing a similar tumour in the opposite half of the bladder. This patient was re-operated on, and six months later a cystoscopic examination did not show any evidence of trouble.

"One case of a large malignant papilloma in the left wall above the ureteral opening, ten months later showed no evidence of return in the old site; but there were many small pedunculated tumours growing from the margin of the urethral meatus. These were removed

and the bases cauterized. The patient has been free from symptoms for four months. We were unable to trace two of the cases.

"The size of these tumours varied from a few centimetres in diameter to one occupying nearly the entire space of the bladder.

"Four of the fifteen patients had more than one tumour. In nine the pathologist reported malignant papilloma. These included all the cases of multiple growths. In three of the cases the pathological report was papilloma, probably malignant. Three cases were of the straightforward carcinoma type with indurated base involving the deeper coats and having the open ulcer on the mucous membrane surface.

"Of the fifteen cases, in twelve the trouble originated in some point of the base of the bladder, and in the remaining three it began in the lateral wall about half an inch from one ureteral opening. In three instances the ureteral orifice itself was involved, and it was necessary to transplant the ureter."

Judd continues as follows: "Although we do not advise or believe it necessary to go through the peritoneum in removing tumours in the upper quadrants of the bladder, our experience would lead us to believe that the greater number of neoplasms of this viscus begin in or near the base, and that we can, with very little if any greater risk to the patient, do a much more technical and radical operation through the peritoneal incision."

Primrose, of Toronto, records a case with a three months' history. He entered the bladder posteriorly through the peritoneum, and discovered the malignant growth invading the base around the left ureter. The entire growth was resected, the ureter being severed transversely 1 cm. from the point of its entrance into the tumour mass. The ureter stump was secured by stitching it to the wall of the bladder under the peritoneal flap, and its cut end was affixed to the mucous membrane by the side of the gap left after removal of the growth. There does not seem to have been any difficulty in tension on the ureter, nor any ascending changes to the left kidney. Primrose continues (and this is the important part of the communication): "It was thought wise not to attempt complete closure of the mucosa where the enucleation of the tumour had left a bare area in the floor of the pelvis. A raw surface in this locality was consequently left, which measured perhaps 4 cm. in diameter. The bladder was now closed towards the peritoneum by a series of No. 2 sterile catgut stitches, the Connell stitch being used, beginning at the bottom of Douglas's pouch and extending all the way on the posterior surface of the bladder to the prevesical fold above. A very successful turning in of the edges was thus accomplished. This closure was supplemented by sterile linen thread No. 1 from the bottom of Douglas's pouch to the prevesical fold, carried as a continuous Lembert suture.

"Douglas's pouch was now swabbed out with some warm normal saline solution. The strips of gauze were removed and the abdominal wound closed. A large-sized rubber catheter was left in the urethra

for the purpose of draining the bladder. The laparotomy wound was closed by No. 1 catgut in the peritoneum, and then by a series of interrupted silkworm-gut sutures, the skin edges being approximated by horse-hair.

"The patient made an excellent recovery. He lost all his pain and distress, and passed water freely by the urethra. There was very little hæmaturia, and he was soon able to leave the hospital completely relieved."

[Criticism by Editor of Section.—Of course the obvious criticism of the question raised is that no route should be a *routine* route —no method a *routine* method—for the removal of vesical growth. Why should we enter the peritoneal cavity, incise a length of valuable posterior muscle layers, and thus necessarily prolong the operation, when we have to deal with a lightly pedicled papilloma which can be readily cut out under the eye, and the whole operation be done within fifteen minutes, with an end result better than if we perform a transperitoneal operation with increased risk? Should custom, fashion, or authority dragoon a surgeon into effecting such unnecessary mutilation? But which surgeon would condemn a transperitoneal operation to allow of sufficient access to a deep and difficult growth? None.

True surgery is established by the end result; and the end result is, and should be, our only criterion of what is judicious surgery. No surgery should be routine, for one case differs from another. The decision as to when the transperitoneal route should be adopted must rest upon the combined clinical findings. Even in deciding on the value of transperitoneal resection for papilloma, the profession will be grievously misled by statistics in the future. Thus, one expert microscopist decides that a villous papilloma has a malignant base; let us say, for the sake of argument, that it has been removed transperitoneally. It will carry its element of weight when the transperitoneal route is finally balanced against the preperitoneal suprapubic; but this same imaginary papilloma might, and possibly would, if submitted to another expert microscopist, be designated a benign growth with an inflamed base—and such a growth might have been more easily and as cleanly removed, with as good an end result, by the suprapubic preperitoneal route. Many, I assert, of our accepted axioms in urology are at present constructed on false premises.—E. H. F.]

Removal of the Entire Bladder.—Since the introduction of a preliminary biureterostomy (compare *Annual*, 1910, *p.* 694) the removal of the entire bladder, or the bladder, prostate and seminal vesicles has been practised to combat the inevitable and agonizing death which occurs in some forms of malignant growth. It is not as yet performed early enough to judge of its value. More often than not, surgery is introduced very late in the course of the disease, or only after widespread inflammatory mischief of the urinary tract has been induced by well-meant but injudicious efforts on the part of the

medical man to relieve or to find out what is the exact cause of the vesical distress. Temporizing and drug treatment when the clinical symptoms are definite and classical; vesical irrigation, which merely feeds the growth by introducing fresh flora into the bladder; unskilled and injudicious cystoscopy—one and all combine to lose the chance of an operative cure by a sweeping surgical procedure such as removal of the bladder. Whether death is not preferable to loin-drainage of the kidneys and that abdominal hernia which follows in the operation scar is another matter. All one can say is, if surgery is to claim any sound success and to confer any prolongation of life on the sufferer, surgery must interfere early and be carried out by a hand accustomed to major operations. I am still unsatisfied with my own cases of complete removal of the bladder. My earlier cases were faulty, and I am yet uncertain, just as F. S. Watson, of Boston, is, as to which is the better preliminary operation for short-circuiting the urine—whether by ureterostomy or renal pelvostomy. Both have grave disadvantages; it is, however, the key to successful removal of the bladder. Whether the peritoneum be opened or not in attacking the latter is a matter of no importance—such should depend absolutely upon the depth of the invasion of the growth through the muscular wall of the bladder.

Rovsing, of Copenhagen,[5] recently reported three cases before the German Association of Surgeons in which he removed the entire bladder through a suprapubic wound, and the ureters were carried out into the loin through the space of Petit, where subsequently the urine was discharged. He has succeeded in performing this operation without wounding the peritoneum. The first patient, thirty-four years of age, was still alive and well when he reported the case eleven months afterwards. The second, a man of sixty-seven years of age, died on the eighth day after the operation; the third, a man aged fifty-seven, was alive at the time his case was reported, four weeks after operation. Lund[6] carried the ureters into the rectum in the first case of complete excision of the male urinary bladder on record for papillomatous disease. Tuffier and Dujarier and Mayo follow this procedure. Paulich, of Prague, transplants the ureters into the vagina in the female, and Sonnenberg carries them into the urethra.

Diverticula.—The operative treatment of large inflamed non-resilient diverticula of the bladder has been ably raised by von Eberts,[7] of Montreal, who reports a very interesting case in which he successfully excised the sac. There is no characteristic symptom of this malformation, and the only real and accurate diagnosis, if it is not found on a chance suprapubic cystotomy, is by means of the cystoscope, or by radiography with colloidal silver oxide (10 per cent) distention of the bladder.

The literature contains the reports of ten cases treated by complete excision—von Eberts' case makes eleven—eight of which had restoration of normal vesical function after excision of the diverticulum.

References.—[1]*Ann. Surg.* 1893, xviii. 408; [2]*Ibid.* 1908, vol. xliii. p. 105;

[3]*Jour. Amer. Med. Assoc.* Dec. 1909; [4]*Ann. Surg.* July, 1902; [5]*Zeits. f. Chir.* (*Deut. Gesell. f. Chir.*), xxxi. 1907, p. 94; [6]*Lancet*, Dec. 13, 1902; [7]*Ann. Surg.* Nov. 1909.

BLOOD, EXAMINATION OF. (*See* HÆMATOLOGY.)

BLOOD-PRESSURE. *Carey F. Coombs, M.D.*

Arterial Pressure in Health and Disease.—Woley[1] has measured the arterial pressure in 1,000 healthy persons varying in age from fifteen to sixty-five. Five physicians shared in this task, and each record was checked by the use of two different instruments. The "average high" pressure was obtained by averaging the highest 15 per cent of records; the "average low" pressure by a similar treatment of the lowest 15 per cent. The following are the chief data. A constant pressure of 160 mm. and above is pathological.

The average pressure for		males	at all ages	..	127·5 mm.
,,	,,	,,	females ,, ,,		120 ,,
,,	,,	,,	persons aged 15 to 30	..	122 ,,
,,	high ,,	,,	,, ,, ,,	..	141 ,,
,,	low ,,	,,	,, ,, ,,	..	103 ,,
,,	,,	,,	,, 30 to 40	..	127 ,,
,,	high ,,	,,	,, ,, ,,	..	143 ,,
,,	low ,,	,,	,, ,, ,,	..	107 ,,
,,	,,	,,	,, 40 to 50	..	130 ,,
,,	high ,,	,,	,, ,, ,,	..	146 ,,
,,	low ,,	,,	,, ,, ,,	..	113 ,,
,,	,,	,,	,, 50 to 60	..	132 ,,
,,	high ,,	,,	,, ,, ,,	..	149 ,,
,,	low ,,	,,	,, ,, ,,	..	115 ,,

The *normal pressures in children* are stated as follows in an article by Seiler.[2] At the age 2–3 the systolic pressure is 80 mm., from which it rises gradually till at 16–17 it reaches 110–120 mm. In children of the same age the pressure varies also with height and body-weight. Sex makes no difference.

In an interesting discussion of the clinical value of accurate sphygmomanometry, Gordon[3] gives the following conclusions as to the variation of arterial pressure in disease.

Nature of Disease	Systolic Pressure	Diastolic Pressure	Pulse-Pressure
Aortic incompetence ..	Very high	Low ..	Much increased
Aortic stenosis	Low ..	Relatively high	Much decreased
Mitral stenosis and Incompetence (with cyanosis)	High ..	High ..	Decreased
Mitral stenosis and Incompetence (without cyanosis)	Variable ..	Variable ..	Variable
Myocarditis	High ..	High ..	Increased
Heart-block	Very high	High ..	Much increased
Dilated heart	Low ..	Low ..	Decreased

"Pulse-pressure" = difference between systolic and diastolic pressures.

He does not consider that disease of the arterial wall sends the blood-pressure up, and quotes cases in which the arteries could be felt to be brittle and tortuous, the blood-pressure nevertheless being low. In thoracic aneurysm he finds differences in the blood-pressure in the two radial arteries. He confirms G. A. Gibson's rule as to pneumonia, that in a favourable case the blood-pressure in millimetres of mercury should exceed the pulse-rate in beats per second. In cases of cerebral compression, the blood-pressure rises in proportion to the added tension within the skull due to the hæmorrhage or other compressing agent; it is not raised in cases of cerebral thrombosis. In Addison's disease the pressure is very low.

Hare[4] has made use of the difference between the systolic arterial pressure in the arm and the leg, as measured in the recumbent posture, in cases of aortic regurgitation, as a means of diagnosis. Gordon says that in such cases the diagnosis may be helped by examination for the presence or absence of the increased pulse-pressure found in aortic regurgitation (see table, p. 205).

The Measurement of Blood-pressure.—During the year various new apparatus have been introduced. A portable form of mercury sphygmometer is described by Leonard Hill;[5] G. Oliver[6] brought an auscultatory sphygmometer to the notice of the medical section of the Royal Society of Medicine; and Singer[7] has devised a clinical apparatus for obtaining graphic records of blood-pressure.

The Action of Drugs and other measures upon Blood-pressure.—Wallace and Ringer,[8] in their clinical experiments with **Nitrites,** come to much the same conclusions as those of Matthew (*Medical Annual*, 1910, p. 178). Both amyl nitrite (inhaled) and nitroglycerin produce immediate lowering of arterial tension in normal persons; this, however, is but transient, particularly in the case of amyl nitrite. The action of erythrol tetranitrate, on the other hand, is delayed and prolonged, while sodium nitrite occupies an intermediate position. All these drugs, given in medicinal doses, have about the same effect on the pressure so far as the scope of the reduction is concerned. Their results with nitroglycerin, sodium nitrite, and erythrol tetranitrate in arteriosclerotics are of interest. Here, again, nitroglycerin acts at once, producing a brief and moderate reduction of pressure; the action of erythrol tetranitrate is not manifest for some time, but it is more enduring, and effects a considerable reduction of pressure; while sodium nitrite occupies an intermediate position in all three respects. It is to be noted that solutions of sodium nitrite do not keep for more than a week.

Miller's[9] conclusions as to the relative value of the different nitrites as depressors are similar; he remarks, however, on individual variation in the reaction to the various nitrites, and says that the clinical value of erythrol tetranitrate is much impaired by the severe headache which it is apt to cause. Daily sweats may accomplish a rather marked

reduction of pressure, lasting throughout the day, so long as the treatment is kept up; but a single sweat reduces the pressure less than a moderate dose of nitrite. The effect of venesection on blood-pressure is very slight and transitory.

Core,[10] in a long and interesting argument for the value of daily blood-pressure readings, says that he found trinitrin inactive, while sodium nitrite and erythrol tetranitrate reduced pressure. A fall in pressure was also produced by sodium salicylate; and iodide of potassium sometimes brings about a gradual decline.

Speaking at the German Congress of Internal Medicine, Müller, Fellner, and Stähelin[11] testified to the experimental and clinical activity of **Yasotonin,** a combination of urethane with yohimbine, in the reduction of arterial pressure and the relief of some of the symptoms caused by high tension.

Treatment of High Arterial Tension.—G. Oliver[12] gives a very full account of his treatment of heightened blood-pressure.

Diet.—Meals must be reduced in bulk and number. Red meats, especially if roast, should be lessened or excluded altogether, also soups and gravies, because of the pressor extractives they contain; boiling dissolves these out, so that for persons with moderate pressures (from 145 to 175 mm.) boiled meat is permissible. Vegetable foods and all non-nitrogenous articles may be given freely. The salt added at table should be forbidden; if there is œdema, the diet must be salt-free, consisting of vegetable soups, fresh green vegetables, fruits, nuts, butter, cream, salt-free bread, potatoes, rice, peas and other legumes, and sugar. Sometimes a pure milk diet with rest is indicated, or a modification consisting of 5 or 6 pints per diem of sour milk with 2 pints of ordinary milk and cooked vegetables. Alcohol, coffee, and tea are relatively or absolutely contraindicated. Fluids should be taken separately from solids; for example, half a pint of warm water containing lemon-juice or citrate of potash may be sipped an hour before meals. Dyspepsia, if present, demands careful and separate treatment.

General Measures.—**Warm Baths** are useful; so is a yearly "cure," to include the **Plombières Douche,** such as Harrogate can supply. Twice daily the patient should rest semi-recumbent for half an hour after food. **Rhythmic Exercises** of the limbs and breathing muscles are to be practised two or three times daily for five minutes. Clothing should be warm, also the climate. High-pressure patients often need to be cheered up, and in many cases it is better not to let them know the readings of the sphygmomanometer.

Drugs.—The bowels are to be kept in order by a dinner pill, with occasional morning salines; **Regulin,** in doses of one or two drachms two or three times daily, is also recommended. The **Benzoates** and **Hippurates** are useful in lowering pressure; potassium benzoate can be given in 5-gr. doses three times daily for an indefinite period. The **Nitrites** should be reserved for cases which do not respond to other treatment, for patients with angina or with crises of hypertension. One or two of the following tabloids may be given daily for long periods,

but should be omitted for a week or so each month: Sodium nitrite, ½ gr.; erythrol tetranitrate, ¼ gr.; mannitol hexanitrate, ¼ gr.; ammonium hippurate, 1 gr.

Among Elliott's[13] suggestions is that of dieting stout persons in such a way as to reduce both body-weight and blood-pressure. Open-air exercise is essential, the best and gentlest forms being walking, golf, sailing, or rowing. Sweat baths once or twice weekly are often useful. He reserves the nitrites for patients with a tension of over 200 mm., and avoids their use in nephritics. Sodium nitrite is the best for routine use; in any case fractional doses are best, and test observations on the effect of a single dose should precede the course of treatment. If there is much arterial degeneration and little response to the nitrites, potassium iodide should be given over a long period.

REFERENCES. — [1]*Jour. Amer. Med. Assoc.* July 9, 1910; [2]*Cor.-blatt. f. Schweiz. Aerzte*, May 10, 1910, in *Med. Chron.* Sept. 1910; [3]*Edin. Med. Jour.* Jan. 1910; [4]*Ther. Gaz.* July, 1910; [5]*Brit. Med. Jour.* Feb. 19, 1910; [6]*Lancet*, July 9, 1910; [7]*Lancet*, Feb. 5, 1910; [8]*Jour. Amer. Med. Assoc.* Nov. 13, 1909; [9]*Ibid.* May 21, 1910; [10]*Med. Chron.* Aug. 1910; [11]*Deut. med. Woch.* May 12, 1910; [12]*Med. Press*, Feb. 2, 1910; [13]*Amer. Jour. Med. Sci.* July, 1910.

BONE-GRAFTING. *Priestley Leech, M.D., F.R.C.S.*

Sir Wm. Macewen[1] draws attention to the usefulness of intra-human bone-grafting and re-implantation of bone. He describes this method as practised by him with success in four cases. In one the humerus was transplanted thirty years ago, and the patient has since earned his living as a labouring man; another was a case of re-implantation of the flat bones of the skull, and the other two were very good cases of restoration of the jaw bone by bone-grafting. It is to be noted that the periosteum plays no part in the bone reproduction after transplantation, and in the majority of cases the periosteum was not transplanted along with the bone.

REFERENCE.—[1]*Ann. Surg.* Dec. 1909.

BONES AND JOINTS (Diseases of).

X-ray diagnosis (*page* 73).

BRACHIAL PLEXUS, INJURIES OF. *Purves Stewart, M.D., F.R.C.P.*

Paralysis of the brachial plexus from traumatism is by no means uncommon. The plexus may be paralyzed in whole or in part, and at different levels, ranging from its origin, close to the cervical enlargement, down to its terminal branches in the axilla. The injuries which produce such palsies are various. Falls or blows in the region of the shoulder are the commonest, and in most cases the shoulder is dislocated as well. But other injuries can also damage the plexus, e.g., traction on the limb during the process of birth, stab-wounds, etc. The frequency with which dislocation of the shoulder is associated with brachial plexus palsy, partial or complete, has led some authors to regard the dislocation as the cause of the palsy, the displacement of the head of the humerus being supposed either to compress, to stretch, or even to rupture the trunk of the plexus. But this explanation,

whilst sufficient to account for certain partial palsies of the plexus, as, for example, isolated lesions of the circumflex nerve with paralysis of the deltoid, is inadequate to explain those cases where the plexus is damaged high up close to its exit from the spinal cord at the lower part of the neck, or where the roots may even be torn from the spinal cord. In such cases, the shoulder dislocation is an accidental complication resulting from the severe primary trauma which injured the plexus. The shoulder dislocation, in fact, is contemporaneous with the plexus injury, but is not its cause. Other cases of partial plexus injury may even be due to trauma during reduction of a shoulder dislocation. Delbet and Cauchoix[1] have recently collected thirty-five cases of brachial plexus palsy associated with shoulder dislocation. According to the grouping of the muscular paralysis, such plexus lesions may be arranged into several classes. Firstly, we have root-lesions, implicating the anterior and posterior roots of the four lowest cervical roots and of the first thoracic root, which go to form the brachial plexus. Such radicular lesions may either be intrarachidian, before they have emerged from the dura mater or joined to form mixed nerves, or they may be extrarachidian, after the roots have pierced the spinal theca and joined so as to form mixed nerves. Clinically, we distinguish these two classes of case by the fact that intrarachidian lesions affecting the fifth and sixth roots are above the level where the nerves are given off to supply the rhomboids and the levator anguli scapulæ, and these muscles are therefore paralyzed; whereas in an extrarachidian lesion these muscles usually escape. In the case of the eighth cervical and first thoracic roots, an intrarachidian lesion will sever the oculo-pupillary fibres of the cervical sympathetic, producing myosis and enophthalmos in the eye of the corresponding side; whereas in extrarachidian lesions these oculo-pupillary fibres are usually unaffected. Whether intra- or extra-rachidian, however, such radicular lesions high up in the roots of the plexus are caused, not by the dislocation itself, but by a concomitant traumatism different from that which produced the dislocation. As for the paralyses directly due to the dislocation of the humerus, they are the effect of lesions low down in the axillary part of the plexus, either in its trunks or in its various terminal branches.

The diagnosis of radicular palsies is reached by a careful study of the distribution of the motor and sensory paralysis. Radicular lesions, as we have already seen, may occur clinically without any dislocation of the shoulder, and they may be produced experimentally by violent traction on the arm. For diagnostic purposes it is of special importance to note whether the rhomboids and levator anguli scapulæ are implicated or not.

Lesions of the trunks of the plexus in the axilla are commoner than radicular lesions. Such trunk lesions are usually the result of direct pressure or stretching by the displaced head of the humerus. In the overwhelming majority of cases, the circumflex nerve is affected, and we consequently have paralysis of the deltoid (also of the teres minor, a muscle which is difficult to test clinically). The circumflex nerve is

in close relation with the lower part of the capsule of the shoulder joint, crossing between this joint and the lower border of the teres minor. Next in frequency after the circumflex, the musculospiral nerve is most often affected, whilst the remaining branches of the plexus are less frequently injured. Various nerves may be contused or stretched, but actual rupture of nerve-trunks in the axilla is very rare, with the solitary exception of the circumflex.

Treatment.—This depends on whether the evidence points to an actual rupture or to mere contusion. In cases complicated by a dislocation of the shoulder, it is important, before making attempts at reduction, to determine whether any of the muscles of the limb are already paralyzed. And in every case, especially if paralytic signs be already present, reduction should be accomplished, not by violent methods, but with every precaution, lest our manipulations should damage the axillary part of the plexus. The dislocation having been reduced, we should wait two or three weeks to see whether the paralytic phenomena show signs of clearing up. If, after that period, no improvement has begun, the question of operative interference should be considered. The electrical reactions of the paralyzed muscles will be of great prognostic importance in such cases.

It is unnecessary to describe the methods by which the surgeon can explore the brachial plexus, whether above or below the clavicle. Suffice it to say that in supraclavicular lesions it is usually advantageous to divide the clavicle in order to obtain a clear view of the upper part of the plexus. Any ruptured nerve-trunks should be "refreshed" and sutured. Then, after allowing an interval for healing of the operation wound, we should persevere for many months with systematic massage and passive movements, and with electrical treatment.

Reference.—[1]*Rev. de Chir.* Mar. 10 and Ap. 10, 1910.

BRAIN, SURGERY OF.

K. W. Monsarrat, F.R.C.S.

The Hypophysis.

Cushing[1] refers to some experimental observations on the partial removal of the hypophysis in dogs. These support the view that a condition of adiposity with infantilism is associated with a diminished activity of the hypophysis. On the other hand, the experimental evidence is fairly conclusive that the sudden removal in its entirety of the pars anterior during a presumed state of health is incompatible with the lengthened maintenance of life. Hyperplasia or the adenomatous condition of the gland described by Marie and Marenesco, produces the group of symptoms seen in acromegaly which correspond to a state of over-activity. Cushing further records an additional case of operation for acromegaly in which the gland was purposely removed only in part. The patient was aged thirty-eight. Eight years previously he had begun to suffer from periodic headaches, and soon after from photophobia. The characteristic features of

acromegaly were present. There was no visual disturbance. The hypophysis was partially removed through a transphenoidal route, associated with osteoplastic resection of the anterior wall of the frontal sinuses. On resecting the wall of the sphenoidal sinus, the pocket of dura enveloping the gland presented and appeared somewhat larger than normal. It was incised longitudinally, and about one-half of the exposed gland was removed piecemeal with the aid of a curette. Hæmorrhage was checked by adrenalin. At the end of ten weeks considerable change had taken place in his appearance. There had been no headache, and hands, face and lips appeared altered for the better. Cushing comments on the comparative advantages of the transphenoidal and the intracranial routes. He holds that in the human subject, access to the pocket of dura in which the hypophysis lies is hazardous, if not practically impossible, by the intracranial route. He admits the dangers from meningeal infection associated with operations through the nasal fossa, but considers that they may be forestalled by the administration of urotropin before operation.

Kanavel[2] has described a new method of reaching the hypophysis by what he entitles an "infranasal route." He states that surgeons are inclined to view the intracranial route with disfavour owing to the dangers incident thereto. "Certainly," he says, "a study of the anatomy and the reports of the pathology present in the cases, distinctly favour the trans-sphenoidal route, and while a few of the tumours rise in the sella turcica, in the great majority of cases they erode the front and grow downward. This latter view must not be lost sight of in considering the proper course to pursue, since we are dealing, not with the normal anatomy, but with a pathologic condition which in this case fortunately lessens the difficulties of the operation." The essential steps of the operation which he recommends are as follows: The nose is turned up, and entrance made into the inferior part of the nasal cavity; the septum is cut along its inferior part and its attachment to the perpendicular plate of the ethmoid. The middle turbinates are removed and the septum deflected to one side. The sphenoidal foramina are located, and the vomer with the perpendicular plate of the ethmoid are cut away. The anterior wall of the sphenoidal sinus is then broken in.

Kanavel[3] later described a case in which he had put this operation into practice. A good view was obtained of the posterior part of the sphenoidal sinus which was occupied by the tumour. This was removed with the curette. Troublesome hæmorrhage occurred, and the patient had fever several days after the operation; when the packs were removed five days later, hæmorrhage recurred, and repacking was necessary; fever and rigors followed, and the patient died five weeks after the operation; there was no autopsy. The tumour was a round-celled sarcoma.

West,[4] who considers the operation from the point of view of the rhinologist, has devised a method which he considers can be carried out without resection of the nose. He suggests that the operation

should be done in two stages, the first consisting of removal of the turbinates on both sides, the anterior wall of the sphenoidal sinuses, and part of the nasal septum. Cocaine and adrenalin are used for the operation. The path to the sella turcica having thus been cleared, the hypophysis can be reached at a second operation. At this he recommends slitting the ala, although he has not found this necessary in any of his experiments on the cadaver. Special instruments are required for the operation, but for the most part they are those familar to rhinologists. In the second stage, he emphasizes the importance of keeping in the middle line. This operation resembles that of Kanavel, with the exception that the latter elevates the nose.

Lecène[5] describes an operation on an acromegalic, aged thirty-eight. In addition to the usual symptoms, he suffered from epileptic crises and other morbid psychical phenomena. The hypophysis was reached by an extracranial route, and 5·7 grams of tumour matter were removed with a curette. Except for slight elevation of temperature during the next six days, there were no untoward symptoms until the twelfth, when the temperature again rose. Subsequently he had intermittent fever, and succumbed on the thirty-sixth day ; no marked modification in his symptoms were noted during this period. At autopsy it was determined that there was no meningitis present ; on the other hand, in the region of the hypophysis there was a tumour of considerable size, with prolongations, one of which occupied the cavernous sinus. Microscopically the tumour was composed of epithelial cells, and originated in the anterior part of the hypophysis.

Eiselsberg[6] reported to the American Surgical Association six cases of operation on the hypophysis. He had employed Schloffer's route, turning the nose to one side, opening the frontal sinuses, and clearing the nasal fossæ. Of the six cases operated on, two were carcinoma, two sarcoma, one a mixed tumour, and one a simple cyst. Two of the patients had acromegaly, and both had died ; a third had had no acromegaly, but after the operation the size of the bony framework of the body had decreased. Two of the cases had been of the juvenile type, and two of degeneration of the hypophysis, with Froelich's syndrome. In most of the cases there had been an improvement in the headache and vision. The first had an uneventful recovery, and was at work again two years after as a clerk. The second case was improving in vision, though the field was still very limited. The third case, a cyst, developed meningitis, from which he recovered. Two years later his general condition was good, but the vision was limited. The fourth and fifth cases were acromegalics, and both died. The sixth was a case of abscess in the hypophysis ; since the operation he had shown a decrease in the size of the skeleton, in spite of the fact that there had been no acromegaly before the operation.

Halstead[7] describes two operations for hypophyseal tumour. The first had no sign of either acromegaly or Froelich syndrome. He had, however, a bitemporal hemianopsia. The nose was turned upwards after incision within the upper lip, and the nasal cavities were cleared.

The sphenoidal sinus was filled by a soft, bluish tumour. The patient recovered; his vision markedly improved, and he returned to work five months after. The tumour was composed of epithelial cells, with papillary disposition. His second case is that of a woman, aged thirty-two, presenting signs of an intracranial tumour associated with bitemporal hemianopsia and slight symptoms of acromegaly. The operation was the same as in other cases; a cyst was removed, the patient succumbed the next day, with a rapid pulse and high fever. There was no autopsy. The cystic tumour was an adenoma of the hypophysis.

Mixter[8] records a case of tumour of the hypophysis with infantilism. He carried out the procedure recommended by Kanavel. On thrusting a blunt instrument through the posterior wall of the sinus, some turbid contents cholesterin escaped. Following the operation the sight gradually improved. The tumour was described by Verhoeff as a congenital epithelial tumour of the hypophysis with cystic degeneration.

Ranzi[9] reports the case of a woman, aged twenty-seven, operated on for a tumour of the hypophysis by the method of Schloffer. She had the ordinary symptoms of intracranial tumour. The sella turcica was enlarged, and she also presented an enlargement of the thyroid and of the thymus glands. A tumour of the hypophysis about the size of a cherry was removed. The patient made a good recovery; her sight markedly improved, and her headaches disappeared. The tumour was epithelial in type.

Crow, Cushing and Homan[10] report on a hundred experimental removals of the hypophysis in dogs. Their observations support the view of Paulesco that total removal of the hypophysis is inevitably followed by death; they further show that the same result follows complete removal of the anterior lobe, even when the posterior lobe remains in place. On the other hand, removal of the posterior lobe did not appear to have any influence on the physiological equilibrium of the animal. The phenomena which are now recognized as those of hypopituitarism were observed after partial ablation of the anterior lobe, that is to say, adiposity and sexual infantilism. Voeckler[11] reports on a tumour of the hypophysis removed from a woman, aged thirty years; the patient died on the third day. The tumour was a malignant adenoma, and had a prolongation into the middle cranial fossa.

Epilepsy.

A discussion on surgical treatment took place at the German Surgical Congress.[12] Krause reported on the non-traumatic forms. With regard to the non-traumatic Jacksonian epilepsy, he held that intervention was indicated for three conditions: (1) Tumours of the cortex; (2) Infantile cerebral paralyses, and (3) In certain cases without a definite anatomical lesion, which were relieved by excision of the corresponding centre. He particularly insisted on the value of operation in the cerebral hæmorrhages of the infant. He had

practised forty-nine operations for non-traumatic Jacksonian epilepsy since 1893 ; there had been four deaths among these cases. Among the recovered, only six could be considered as radically cured ; that is to say, this number had had no epileptic crises since the operation, and the most recent case reported was five years old. Some of the cases had been lost sight of ; others appeared to be complete cures, but were of too recent date for this to be certain. With regard to essential generalized epilepsy, Krause had for a long time discountenanced any intervention, but the successes of Kummel and Friedrich had induced him to operate on these cases, and since 1906 he had done so on thirty-one occasions. The results were far from being constant, but he was able to report several very considerable ameliorations which almost amounted to recoveries. He quoted some very convincing examples.

Friedrich stated that for some years he had recommended operation in essential epilepsy. He believed that the importance of the distinction between Jacksonian and essential epilepsy had been exaggerated, that the transformation from one to the other was possible, and also that injuries often played a part in the production of the type called essential. He had operated on twenty-five epileptics of long standing. The most brilliant results had been obtained in three cases where definite anatomical lesions had been found (psammoma of the frontal lobe, complete recovery for two and a half years ; traumatic cyst, recovery for a long period ; injury to the skull, complete freedom for three years). Among the twenty-five cases operated on, eleven had been cases of essential epilepsy.

Carr[13] writes on a series of twenty operations for epilepsy ; all but one were benefited, and six out of the twenty had passed a period of three years without recurrence of their attacks. In all the cases marked lesions, gross and microscopic, were found. Carr practises a wide osteoplastic method which makes it possible to explore large areas of the cortex. His cases appear to have stood the operation well, as there was no immediate mortality.

Cluss,[14] who has collected twenty-one observations on cases of Jacksonian epilepsy from the clinic of von Bruns, in particular with a view to their history after operation, concludes that it is always necessary to wait at least three years, and even five years, before deciding that a case of traumatic Jacksonian epilepsy is definitely cured by an operation. The chances of permanent cure are greater the younger the subject, and are also more favourable when a definite and circumscribed local lesion is found, such as a serocyst or a thickening of the dura or exostosis. In all cases it is advisable to incise the dura mater after making an osteoplastic resection. Cluss does not agree with the view of Kocher that it is advisable to leave a cranial defect with the idea of providing a sort of safety-valve ; cases in which the osteo-flap was replaced in its entirety gave permanent good results. Cluss also considers it useless to resect cortical motor centres, although the paralysis which results from this resection usually almost completely disappears.

Tumours of the Eighth Cranial Nerve.

In a previous number of *Hygeia*, Henschen[15] published nine cases of tumour of the cerebro-pontine angle, eight of them being tumours of the eighth nerve. This variety of new growth forms a special group among intracranial tumours, and the prospects of surgical treatment are good. Early diagnosis is, on the whole, usually possible. The tumours are generally of a benign character and capable of complete removal. In the present contribution he reviews 119 of these cases from medical literature. In 25 a surgical operation was performed, and in 5 a good result was obtained. Tumours of the cranial nerves are rare, and it is probable that we must look to certain embryonic factors to explain their frequency in connection with the eighth pair. Henschen considers that the true tumour of the auditory nerve arises from the base of the internal ear, in the connective tissue which surrounds the vestibular nerve, arising there it makes its way into the posterior cranial fossa after reaching a certain size. If this account of its origin is correct, and it is supported by careful microscopy, an early diagnosis should be possible from the examination of the internal ear and particularly of the posterior labyrinth.

Starr[16] writes an important article on the same subject. Apart from the general symptoms of intracranial tumour, there are certain others which are special to these tumours of the eighth nerve. These may be divided into three groups :—

(1) Symptoms dependent on compression of cranial nerves : these are slight anæsthesia of the face on the side corresponding to the tumour, in particular an anæsthesia of the cornea ; pareses of the sixth nerve on the same side as the tumour ; pareses of the facial muscles on the same side ; noises in the ear on the same side, sometimes followed by loss of hearing ; vertigo due to irritation of the labyrinthine branch of the auditory nerve ; alteration of the voice from compression of the ninth pair ; occasional attacks of acceleration of the pulse and faintness from the irritation of the vagus ; paresis of the tongue, associated with difficulty of speech and deviation away from the side of the tumour.

(2) Symptoms due to compression of the peduncles and hemisphere of the cerebellum : these are uncertainty of gait and tendency to fall laterally, marked alteration in tonus in the muscles of the limbs on the side of the lesion, inclination of the head towards the side of the lesion.

(3) Symptoms due to compression of motor and sensory nerve bundles which cross the pons.

Starr reports six illustrative cases, and also analyzes 294 reports of operations ; in 162 of these a tumour was found and removed, and in 69 the patient recovered from his operation and from the morbid phenomena from which he suffered. With regard to the methods of operation, Starr states that it is absolutely necessary to provide a wide exposure of the cerebellum by bilateral resection of the occipital ; this resection allows of a lateral displacement of the cerebellum and avoids any compression of the medulla, which compression has been a frequent

cause of death either at or soon after the operation. He considers that when resection has proved difficult, or hæmorrhage troublesome, the operation should be done in two stages. The tumour should be carefully separated from its surroundings, in order to avoid hæmorrhage from the neighbouring vessels and damage to the seventh and eighth nerves.

Chronic Serous Meningitis.

This affection, which is more frequent than is commonly believed, consists in the formation of a circumscribed collection resulting from adhesions which isolate a meningeal area. It may result from injury or from a chronic or acute infection. The symptomatology is that of encroachment on the intracranial space. Oppenheim and Borchardt[17] report an instance of an infra-cerebellar collection, where the patient displayed the phenomena of a tumour of the cerebellum. A collection of fluid was evacuated from beneath the cerebellum, and appeared to be situated within a compartment of thickened arachnoid. The patient recovered, but the operation had to be repeated five months later, since which time she had shown an almost complete recovery from her nervous symptoms. Borchardt reports a second case of a similar character. The patient had had an injury, with hæmorrhage from the nose and throat, at the age of sixteen, and six months after the accident had suffered from headache and vomiting, a diagnosis of tuberculous meningitis being made. The girl recovered, but several years after she developed all the symptoms of a cerebellar tumour. At the operation, a cystic collection was opened in the ponto-cerebellar region, and this was followed by a complete recovery.

Raymond and Claud[18] report an instance of the same condition in the left parieto-temporal region, associated with the symptoms of headache and convulsive phenomena in the limbs on the right side. The patient was very enfeebled at the time of operation. Lumbar puncture yielded normal cerebrospinal fluid ; the patient died soon after the operation was completed. A cystic collection of fluid was found in the position indicated. The authors give an admirable résumé of the literature of this subject, and state that the symptoms are simply those of increased intracranial pressure, and so the condition is difficult or impossible of exact diagnosis. They consider that had their patient received surgical treatment at an earlier stage, the prognosis would have been good, and they emphasize the importance of investigation of the subject in view of the relief likely to result from operation.

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PLATE XV.

BREAST ABSCESS: TREATMENT BY SUCTION APPARATUS.

(J. M. GRAHAM, Edinburgh Royal Infirmary.)

Fig. A.—The application of the large breast cup for intra-mammary abscess.

Fig. B.—Shows the size of incisions used in a large abscess, induration not being marked. Healed in ten days.

Fig. C.—Shows broadening of the incision in the lower quadrant, which delays healing after the suppuration has ceased.

Fig. D.—Shows the coronal incision made in the lower quadrant for suppuration near the periphery.

BREAST ABSCESS. *Priestley Leech, M.D., F.R.C.S.*

J. M. Graham[1] records the results obtained in a series of cases of acute mammary abscess, in the surgical out-patient department in the Edinburgh Royal Infirmary, by means of **Suction Apparatus** (see *Plate XV*). It was hoped by this treatment to avoid certain disadvantages of free incision and drainage. After a moderate suppuration, the loss of function is often complete at future pregnancies. It is claimed for this method that short incisions are sufficient, drainage tubes can soon be discarded, healing is more rapid, and the function of the breast is less likely to be disturbed. Thirty-two cases in thirty patients were seen. In all except two cases the breasts were functioning at the onset of inflammation ; in 17 cases the abscess began within three weeks of the confinement ; in 8 at other periods of the puerperium ; and in 5 cases the symptoms commenced after weaning. Infection from the nipple was the obvious cause except in two instances, where there was a pustular rash on the skin. The pus from 28 abscesses was examined. The results of culture gave one case where the *Streptococcus pyogenes* was the only organism present ; in the rest the various forms of staphylococci ; in 11 *S. aureus* ; in 5 *S. albus* ; in 3 *aureus* and *albus* ; 3 *citreus* ; 2 *citreus* and *flavus*. The severer inflammations were due as a rule to the *S. aureus* ; the pus was thicker, the tissues of the breast infiltrated round the abscess, and freer incisions were necessary. The suction cup is applied three to six times for five minutes, with a few minutes' interval between each application ; this is repeated daily, and is continued for a few days after the suppuration has ceased. It is necessary that the cup should fit the breast exactly ; and where many cases have to be treated, a series of cups of different sizes must be at hand. A moderate degree of suction only is required, and will produce swelling and congestion of the breast without any pain. Milk is most readily removed by a small cup over the nipple, although a considerable amount comes away in addition with the large breast cup. A general anæsthetic is needed for the incisions. In a series of cases, short incisions were made of $\frac{1}{2}$ to 1 cm. (less than $\frac{1}{2}$ in.), as recommended by Bier. This answered well where the abscesses were circumscribed ; but when they were large, affecting more than one quadrant, there was a tendency for secondary abscesses to form. In the majority of cases the incisions were made $\frac{3}{8}$ to 1 in. or more in length, sufficient to allow the finger to explore the interior. One or more incisions were made, according to circumstances, and if the whole breast was involved all four quadrants were incised. The incisions as a rule were radial, but when the suppuration extends to the periphery, the incisions are better made along the margin, as they do not gape so much. When the abscess is diffuse, the pus thick, and the tissues brawny, with inflammation, it is advisable to incise freely.

This treatment hastens healing, and suction is particularly useful in supplementing drainage. The suction hastens the healing of chronic sinuses which refuse to heal with simple drainage. Notes of the cases are given.

Bernheim,[2] of the Johns Hopkins Hospital, states that most gratifying results have been obtained in infections of the breast with Bier's treatment. The routine treatment is as follows: If seen early, before pus has formed, cupping is instituted for from fifteen to forty-five minutes daily, the breast between treatments being put up in a wet boric dressing, and nursing from it stopped. Abscess formation can thus frequently be stopped. If pus has formed, the abscess or abscesses are incised under ether or gas, pockets broken down with the fingers, and thorough drainage ensured by means of iodoform gauze. Twenty-four hours later a cup 1 cm. larger than the breast is applied, with the drainage gauze still in situ; a very moderate degree of suction is first applied—just enough to cause slight blushing of the skin and very little bleeding. This is continued for about five minutes, when the cup is removed and the breast allowed to rest for two minutes, after which the cup is again applied. This alternate cupping and resting is kept up until actual hyperæmia has been instituted for from fifteen to forty-five minutes, varying according to the condition of the patient and breast, and the amount of the bleeding. The drains are usually adherent at first, but loosen in a day or two after cuppings. If the large cup does not draw away pus, use a small cup for a few minutes: but this is more painful. After the cupping has finished, a wet boric-gauze dressing is applied, a piece of wet gauze is placed in the mouth of the incision to prevent its closing, and the breast is loosely bandaged. This is repeated every day or other day, or even twice a day. He believes it wise to continue lactation; and the cupping aids in this, several of the patients having been able to continue suckling after the breast has healed. When patients have come with a sinus, this has been laid open and packed for twenty-four hours, and then the treatment has been instituted. The advantages of the method are: (1) Almost absolute freedom from pain during the whole course of the disease; (2) Better preservation of the gland function, both for present and future lactations; (3) Minimum of scar formation; (4) Shortening of the course of disease; (5) Prevention of abscess formation in cases seen early enough.

References.—[1]*Edin. Med. Jour.* Nov. 1909, and *Med. Press*, Ap. 6, 1910; [2]*Jour. Amer. Med. Assoc.* July 2, 1910.

BREAST, CANCER OF. *Priestley Leech, M.D., F.R.C.S.*

Speese,[1] of Philadelphia, discusses the malignant degeneration of benign diseases of the breast. He follows Warren's classification. Certain tumours which clinically present the appearance of malignancy do not show the corresponding histological changes, and on the other hand, carcinoma occasionally arises in a pre-existing tumour without causing symptoms indicative of such a transformation. Operative interference in all tumours of the fibro-epithelial type is thus indicated, to prevent the occurrence of malignancy. What Warren calls abnormal involution, but what is generally called a chronic mastitis or chronic cystic mastitis, occurs more frequently than any other disease

of the breast with the exception of carcinoma. Speese has made an analysis of 180 cases of breast disease, of which 18 per cent were cases of abnormal involution; and in 35 such cases, studied in the laboratory, 9 instances of malignancy were encountered (26 per cent). A list compiled from various authors recorded 295 cases of abnormal involution, and among these 44 (15 per cent) were malignant. There are no sure clinical signs by which malignancy can be determined in the early cases, and the diagnosis of early malignancy will usually have to be made at the time of operation, or subsequently on microscopic examination. In doubtful cases it is better to excise the whole breast.

Beatson[2] gives notes of two cases of removal of breasts for innocent tumours, in which malignant disease developed in the vicinity of the scar. He suggests that the common explanation of this occurrence, viz., that it is due to incomplete removal, may not be the correct one, but that the malignant disease may have arisen *de novo* in an outlying and separate portion of the mammary gland. It is well known that lobules of the mammary gland may be found between the fibres of the pectoralis major muscle, and unless the whole muscles are removed (which is not done in innocent diseases of the breast), these outlying lobules would remain, and might become the seat of malignant disease. In both the cases recorded by Beatson a microscopic examination was made; one was cystic disease of the mamma and the other fibro-adenoma. [Another explanation may be that there was a small focus of malignant disease in the original breast, which would not be discovered microscopically unless serial sections were made.—P. L.]

Powers[3] records recurrence of malignant disease in the scar seventeen years after removal of the breast.

Bonhôte Henderson[4] has a most interesting and valuable communication on doubtful tumours of the breast, which were observed at the Brompton Cancer Hospital. He describes a series of cases of tumours of the breast which were suspected to be malignant. After operation, some of these were proved to be innocent, some were malignant, and some, even after microscopical examination, remained doubtful. He has also[5] investigated the infection of the serratus magnus in cancer of the breast. It is an anatomical fact that normally one-third of the female breast lies on the fascia over the serratus magnus, corresponding to the lower and outer third of the breast, and to the digitations of the muscle arising from the fifth and sixth ribs; it is probable that no portion of the breast lies upon the upper portion of the serratus magnus, and he confined his investigations to the lower serrations, viz., those arising from the fifth and sixth ribs. The muscle is naturally divisible into three portions: (1) A muscular bundle from the first and second costal arches, which is inserted into the ventral aspect of the upper angle of the scapula; (2) A bundle from the second, third, and fourth ribs, which is inserted into the whole of the ventral aspect of the vertebral border of the scapula between the upper and lower angles; (3) A bundle from the fifth, sixth, seventh, and eighth ribs is inserted into the ventral aspect of the inferior angle. The innervation of the

muscle follows this muscular and anatomical division, the three bundles being supplied, subject to occasional variation, by the fifth, sixth, and seventh cervical nerves respectively. He thinks removal of the lowest bundle (from the fifth, sixth, seventh, and eighth ribs) does not impede the use of the arm, and should be done in routine removal of the breast for cancer. The serrations can be detached from their origin, stripped back, and divided close to their insertion. The lowest fasciculus of the pectoralis minor is a guide to the fifth rib. He thinks non-removal of these digitations may explain recurrence after operations, especially recurrence posteriorly. He could find no evidence of malignant permeation of the muscle in several early cases of mammary carcinoma which he investigated, but thinks that a more perfect technique and more thorough investigation will probably reveal similar conditions to those obtaining in the pectoralis major.

Leitch[6] draws attention to *peau d'orange* and acute carcinoma of the breast. Acute carcinoma of the breast is somewhat rare, and Leitch during five years' clinical and laboratory investigation of cancer in London only saw this condition on two occasions; in Glasgow he has seen four, and in Dundee one in the same number of years. There are two points which are diagnostic of the condition, and the conjunction of these two signs is pathognomonic: they are the diffuse swelling like a hypertrophy of the mamma, and the occurrence of *peau d'orange* This latter is distinctive enough to any one who has seen the condition, but to any one who has not, a wrong impression might be given; in acute carcinoma this *peau d'orange* is represented by minute pits in the skin about a quarter of an inch apart, giving the appearance as if the skin had been dabbed with a blunt pin. These depressions are the exaggerated pits of the hair follicles; the corium is expanded from lymphatic permeation and consequent lymph stasis, and the overlying epithelium is raised above its normal level by the pressure, except at those places where it is bound down by the insertion of a hair follicle deep in the corium, where it is moored as it were.

Priestley Leech[7] gives the results of one hundred operations for carcinoma of the breast. He draws attention to the fact that even if the true cause of cancer be discovered, we shall be a long way from curing cancer, unless both the profession and the public are much better educated as to the insidious commencement of most cases, and the means of diagnosis improve. We know the cause of tuberculosis, but how many cases infected with tubercle still die! The steps of the operation which has been performed in these cases is as follows:

The incision commences over the tendon of the pectoralis major, and is continued along the anterior fold of the axilla until just before it reaches the edge of the mamma; the further course of the incision is regulated by the situation of the growth in the breast. It is so planned that the growth forms the centre of a more or less round or oval incision, so that there is (as far as can be ascertained) a margin of healthy skin of a breadth of 2 in. to 3 in. round the growth (*Plate XVI, Fig. A*). If the skin is adherent, more is taken away, no consideration

PLATE XVI.

BREAST CANCER.

(PRIESTLEY LEECH'S OPERATION.)

Fig. A.—Skin incision. The dark line round the nipple shows apparent size of new growth.

Fig. B.—Shows wound after removal of breast and pectoral muscles. Ribs and intercostal muscles shown.

PLATE XVII.

BREAST CANCER.

(PRIESTLEY LEECH'S OPERATION—*continued.*)

Fig. C.—Incision sewn up. Shows the two drainage tubes.

Fig. D.—Shows upward range of movement of arm two to three weeks after operation.

Fig. E.—Shows backward range of movement of arm two to three weeks after operation.

PLATE XVIII.

BREAST CANCER.

(PRIESTLEY LEECH'S OPERATION—*continued.*)

Fig. F.—Position in which the arm is placed after operation.

Fig. G.—Alternative position of arm after operation. The arm may be placed first in one and then in the other position, to relieve the patient.

being paid to the subsequent closing of the wound. The incision is carried down over the epigastrium ; the skin is then dissected back as far as the clavicle above, the sternum on the inner side (or even further, if the growth is near the inner margin of the mamma), beyond the latissimus dorsi on the outer side, and the deep fascia over the upper part of the abdominal rectus and external oblique is bared. As little fat as possible is left on the skin. The handle of the knife is then pushed down between the fibres of the pectoralis major to separate the fibres actually attached to the clavicle, and the left forefinger follows it, passing underneath the tendon of the pectoralis major, which is then divided on the finger by knife or scissors ; the left hand pushes the muscle downwards with a piece of gauze, and the pectoralis minor is divided near its insertion into the coracoid process. The two pectoral muscles are then separated from the thoracic wall by knife and gauze-covered fingers ; the deep fascia is dissected off the external oblique and the rectus below. The axilla can be cleared, if desired, before the breast and underlying muscles are separated from the thorax, or afterwards. Generally, they are separated from the chest wall downwards nearly to the subscapularis muscle ; removing the digitations of the serratus magnus, and then dissecting away the tissues from the outer incision above, exposing the axillary vein and clearing out the axilla from above downwards, beginning underneath the clavicle (*Plate XVI, Fig. B*).

The incision is then sewn up with a continuous button-hole suture of linen thread ; a few silkworm-gut sutures are inserted, perhaps every four inches, and two drainage tubes are used, one in the usual situation in the axilla, and the other over the rectus muscle at the abdominal extremity of the incision (*Plate XVII, Fig. C*). As a rule the edges come together very well without undermining. If they will not meet with undermining, a flap can often be cut from the skin below, and on twisting it the whole of the incision can be closed. This operation has given a very low percentage of local recurrence, the test of a successful operation ; the surgeon has no command over internal, but he has over external, recurrence.

To minimize shock as much as possible during operation, sterilized towels wrung out of hot sterile saline solution are placed over the chest and over the wound ; these are renewed before they become cold, and the wound is exposed as little as possible, bleeding vessels being closed immediately with forceps. No antiseptic solutions come in contact with the wound, and rubber gloves are always worn. A hypodermic of $\frac{1}{4}$ gr. morphia is given before the patient leaves the table. Only one death has occurred from shock out of 118 cases.

The arm is not bandaged to the side, but is slung up at right angles to the body by a broad bandage passing round the upper arm and the head of the bedstead (*Plate XVIII, Figs. F* and *G*). He has used this method of putting up the arm for eleven years, and the results have been quite satisfactory ; at the end of a fortnight the patients can do their own hair, and can raise the arm straight above the body (*Plate*

mastitis may be regarded as a morbid deviation in the physiological processes of evolution and involution which normally take place in the breast in correspondence with the sexual crises of a woman's life: puberty, menstruation, pregnancy, lactation, and the menopause. Apart from these physiological tides of tissue change, mild bacterial invasion of the ducts and obstruction to the ducts also play a part. There may be such a development of cysts that the name "cystic disease of the breast" has been given to it, but this differs in no essential respect from chronic mastitis.

Symptoms.—Many women present some degree of chronic mastitis without any corresponding symptoms. In other cases pain is a prominent symptom: usually a dull ache, occasionally severe, lancinating or neuralgic in character, and very intractable. Sometimes there is discharge from the nipple. Areas of chronic mastitis are not infrequently met with in the immediate neighbourhood of a fibro-adenoma. The pathology is not difficult to fathom if it is remembered that a fibro-adenoma often arises in connection with a duct, and necessarily obstructs it. The acini which open into this duct, having no outlet, undergo the usual changes of chronic mastitis. This condition is often exceedingly difficult to differentiate from a carcinoma. A fibro-adenoma may also originate in an area of pre-existing chronic mastitis by overgrowth of the connective tissue of one particular lobule of the affected area. In duct papilloma, chronic mastitis may arise from obstruction of the ducts. It is not uncommon to find the axillary glands slightly enlarged in chronic mastitis; they are firm, elastic, and sometimes tender. It seems likely that cases of chronic mastitis where the glands are unduly palpable are more likely to end in cancer than those in which this sign is absent. In such cases, removal of the breast may be the best course to pursue, but no general rule can be laid down.

Treatment.—(1) **Pressure** applied by means of strapping, or less effectively by bandages (massage is not advisable). (2) Inhibition of the secretory activity of the epithelium by **Belladonna** and **Iodides,** (3) Drugs to promote absorption of inflammatory infiltrations, especially **Mercury** and the **Iodides.** In numerous instances, especially at the climacteric, drug treatment seems to have no effect. In such cases removal of the breast is justifiable. If the patient refuse this, Sampson Handley suggests the use of the **X-rays.** He has tried this in some cases, and though the evidence is not convincing, he has advised the application of *x*-rays after operation for cancer; in fifty cases he has only seen local recurrence in the skin in three, and he thinks the rays have had some influence, as in two of the three cases of recurrence no *x*-ray treatment was applied. He thinks *x*-rays stimulate the connective tissue and depress the epithelium, and that their moderate use cannot cause cancer.

Reference.—[1]*Pract.* Ap. 1910.

BRIGHT'S DISEASE. (*See* Nephritis.)

BROMIDE ERUPTIONS. *E. Graham Little, M.D., F.R.C.P.*

Ormsby[1] met with three cases of bromide eruption closely simulating blastomycosis. Plaques much like condylomata occurred chiefly on the extremities, and were sufficiently like blastomycosis to deceive physicians with large experience of that disease. The first case was in a boy, aged sixteen, the subject of convulsions or fits, for which he was treated with bromides; it is not stated in what doses. Search was made for blastomyces with negative result. The eruption continued to appear for over a year, during the administration of bromides. The second case was in a woman, aged twenty-nine, seen by the late Dr. Montgomery. The lesions are recorded as clinically typical of blastomycosis; repeated examinations for the organism were made. Later, pustules more typical of bromide eruption appeared; the patient was taking this drug for fits. The lesions continued to appear during a twelvemonth, and ceased when the drug was discontinued. The third case was in a child, aged seven, who had had the eruption for two years. She was taking bromides for epilepsy.

I have recently seen an unusual case of bromide eruption in a man, aged thirty-five, who was taking 30 gr. a day of ammonium bromide. Two years after commencing this treatment, there was an acute eruption of pustules and large plaques, distributed widely over the body; the extent and distribution of the eruption suggested a pustular syphilide; but a Wassermann reaction proved negative. The fact of bromide ingestion was then ascertained. Eruptions are less usual in adults than in children, and extensive distribution is quite uncommon. The eruption slowly subsides on ceasing the drug; **Arsenic,** given internally, may hasten the dispersal of the lesions.

Reference.—[1]*Jour. Cutan. Dis.* Oct. 1909.

BROMIDROSIS OF THE FEET. *E. Graham Little, M.D., F.R.C.P.*

Major Hale,[1] R.A.M.C., describes a very effective routine treatment for this condition, which he has practised in army-patients with great success. The patient's socks, boots and shoes are impounded; the former are soaked for an hour in 1–2000 perchloride solution, and then rinsed three times in hot water, and finally well washed. The inside of soles, vamps, quarters, and counters of boots and shoes are painted with the following lotion:—

℞ Acid. Salicyl. ℥j | Spt. Vin. Meth. ℥iv

The feet are well washed, thoroughly dried, and painted also with the same solution over the whole area affected; new socks are then put on, and the feet are repainted the following day. The patient must be encouraged in habits of greater personal cleanliness after the cure.

Reference.—[1]*Jour. R.A.M.C.* Jan. 1910.

BRONCHIECTASIS.

(*Vol.* 1910, *p.* 196)—W. P. Herringham found very definite improvement in a case of bronchiectasis under treatment by continuous inhalation of **Oxygen.** It proved more beneficial than creosote vapour.

BRONCHITIS.

Iothion in (*page* 33).

BUBO. *Priestley Leech, M.D., F.R.C.S.*

Murtagh[1] recommends the following treatment for the rapid cure of suppurating bubo. The first point is to destroy the original source of infection; if this is not done, the gland becomes continually re-infected. The usual cause, especially in military service, is a chancroidal condition of the penis. The first step is the application of the Paquelin cautery to the chancroidal ulcers, thus converting a septic sore into a simple, granulating surface. Then incise the healthy skin one to one and a half inches below the bubo, and pass the knife into the bubo through healthy tissue. Pus, if present, is evacuated by pressure, and then every portion of the diseased gland is removed by the curette; the cavity is irrigated with 1–2000 bichloride solution. If hæmorrhagic oozing is present, inject a small quantity of peroxide of hydrogen, followed by irrigation with sterile water. Then fill the cavity with 10 per cent iodoform in vaseline. The vaseline is melted with the iodoform in it, and when melted the mixture is drawn up and expelled from a syringe several times until it is thoroughly mixed. Glass penis syringes are then filled with the mixture, and are immediately dipped into ice-cold water for ten minutes. The cavity can be filled by means of these syringes. The average length of treatment in some two hundred cases has been twelve and a half days.

Reference.—[1]*N.Y. Med. Jour.* Sept. 4, 1909.

CÆSAREAN SECTION, EXTRA-PERITONEAL. *Dr. Hugo Sellheim, Tubingen, Translated, with Introductory Note, by E. W. Hey Groves, M.S., F.R.C.S.*

Introductory Note by the Translator.

To those who are not familiar with the recent modifications of Cæsarean section, a few explanatory remarks may be of assistance.

The *Classical* operation is the one commonly performed in this country. The abdomen is opened in the mid-line below the umbilicus, and the body of the uterus incised by a median cut through which the child is extracted. After the removal of the placenta, the uterine wound is sewn up, the whole manipulation being within the peritoneal cavity.

Vaginal Cæsarean section is an operation only used in those emergencies where rapid delivery is demanded in the presence of a contracted cervix, such being most notably eclampsia and placenta prævia. One or more deep incisions are made into the anterior and posterior lips of the cervix, and the child is hastily extracted per vaginam.

The extraperitoneal operation, first suggested and practised by Prof. Sellheim, is a method of opening the uterus and extracting the child above the pubes, whilst keeping the peritoneal cavity shut off from the operative field.

The abdomen is opened by a curved transverse incision having its convexity downwards over the pubes (Pfannenstiel's *Plate XIX*). This divides the skin and the aponeurosis in front of the recti muscles. The flap of skin and aponeurosis is dissected from the recti and turned upwards. The muscles are then strongly retracted, one to each side, and the parietal peritoneum with the loose cellular tissue in front of the bladder is exposed. One of two courses may now be followed :—

In Latzko's method (*Plate XX*) the bladder is strongly drawn to one side, and the dense bands of fascia (the lateral and median ligaments of the bladder) which attach it to the pelvic wall and parietes are divided. The bladder with the lower fold of parietal peritoneum thus mobilized are held on one side by a retractor, and the lower uterine segment is laid bare for incision.

The method preferred by Prof. Sellheim, as giving a less distorted access to the uterus, is as follows : The parietal peritoneum is separated as far as possible from the upper surface of the bladder, and then divided transversely. Another transverse cut is made through the peritoneum across the furrow between the bladder and uterus. These two divisions of the peritoneum join one another at their lateral extremities, and serve to isolate the serous covering of the bladder, which is too firmly fixed to it to allow of reflection. The edges of the opening in the peritoneum are carefully sewn together, and the sutured fold thus formed is separated by blunt dissection from the anterior surface of the lower uterine segment and retracted upwards. A median incision serves to open the uterus and extract the child and placenta. The uterine incision is closed by deep stitches, some of which also grasp the sutured edge of peritoneum (*Plate XXIII*). The recti muscles are united by catgut ligatures which include the parietal peritoneum, the aponeurosis is sewn up by a continuous suture, and the skin is united by Michel's clips. A comparative idea of the scars left by the classical and by Sellheim's method may be gained by the drawing of the abdomen of a patient on whom both operations had been performed with an interval of seven years (*Plate XXII.*).

Formation of a Utero-abdominal Fistula.—In certain rare cases which present a grave danger of septic infection (e.g., a sloughing growth of the cervix), the above procedure is modified by suturing the edges of the uterine incision to the skin instead of closing the wound. The detail of this method and the appearance of the wound on the fifth day subsequent to delivery are shown in *Plates XXIII* and *XXIV*. [E. W. H. G.]

Although many recent publications deal with the modern improvements in the technique of Cæsarean section, none have as yet sufficiently considered their results. The new method is too little practised because conviction has not been reached as to the lasting good it can accomplish. I therefore propose, in the present paper, to confine myself chiefly to an examination of the results obtained by the extraperitoneal

operation, leaving those who are interested in further details of its technique to refer to my earlier publications. I will only briefly consider by the way one or two disputable points of technique in so far as these may have a bearing upon operation results.

Up to the present I have conducted forty-six *deliveries through an incision in the lower pole of the uterus.* Besides the typical extra-peritoneal uterine section, the technique of which has been fully explained by myself, the following methods were tried :—

	Cases
Pfannenstiel's transverse transperitoneal incision	1
Ritgen's vagino-peritoneal incision (attempt)	1
Attempt at a vagino-peritoneal incision from the mid-line	1
Veit's longitudinal incision through the abdominal wall and through the parietal and visceral peritoneum	1
Preliminary attempt to form a utero-abdominal fistula	1
Frank's suprasymphyseal delivery	1
Delivery through a utero-abdominal fistula	1
Latzko's method	1
Extraperitoneal uterine incision, using a longitudinal abdominal incision instead of Pfannenstiel's transverse incision	2
Transperitoneal uterine incision, following Pfannenstiel's transverse incison, with subperitoneal burial of the entire tubes	1

The operations were undertaken on account of :—	Cases
Insuperable obstruction in contracted pelves	21
Placenta prævia	15
Eclampsia	4
Cardiac disorders (including one with intense struma)	2
Danger of infection by foul cervical growths	1
Great prolapse with suppuration	1
Impossibility of delivery owing to ventro-fixation	1
Death agony of purulent meningitis	1
Total	46

In these cases the greatest interest is the *mortality rate.* Of the mothers five died, of the children six. The comparatively high proportion of fatal cases was due to frequent occurrence of dangerous diseases and complications unconnected with the operation.

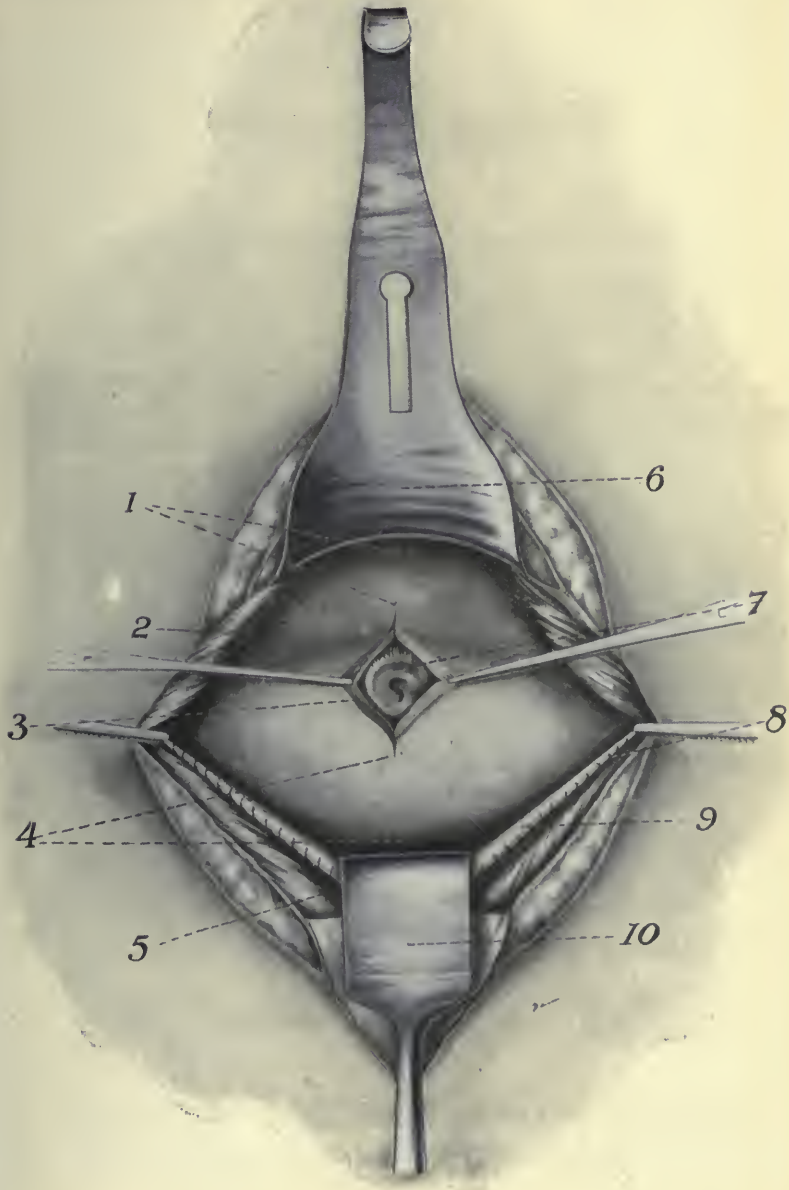
Causes of Maternal Mortality :—	
Eclampsia	2
Anæmia following placenta previa	1
Diffuse sepsis	1
Purulent meningitis	1
Total	5

Causes of Child Mortality :—	
Still-birth, with indistinct heart sounds before the operation, resulting from placenta prævia	1
Pneumococcal infection contracted in utero	1
Septic pneumonia	1
Feeble vitality of an infant weighing 1200 grams in a case of eclampsia	1
Asphyxia following the occurrence of a knot in the cord	1
Congenital syphilis 14 days post partum	1
Total	6

PLATE XIX.

EXTRAPERITONEAL UTERINE SECTION.

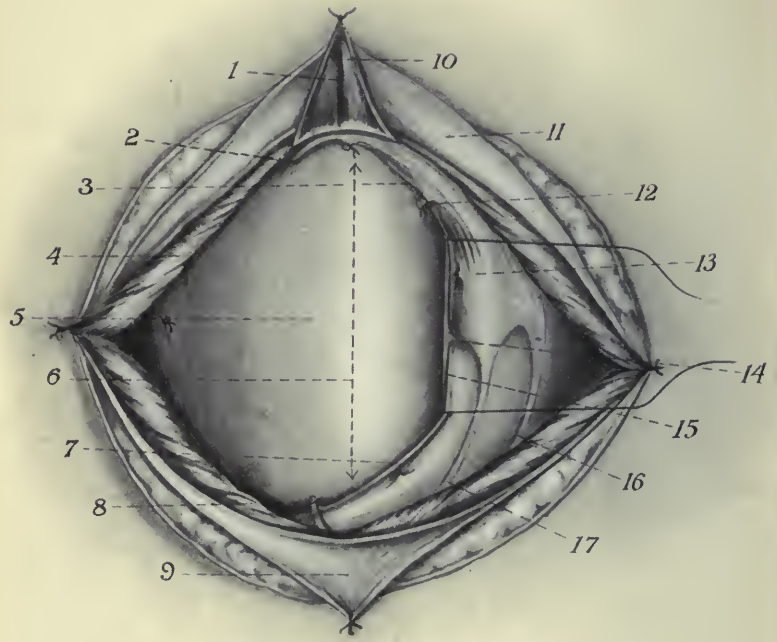
The abdomen is opened by Pfannenstiel's transverse incision. The lower uterine segment is exposed by pushing the bladder downwards and the peritoneal fold formed by careful separation and suture after opening, upwards. A sagittal incision is made into the lower uterine segment.



(1) Lower portion of the cervix uteri exposed by extraperitoneal dissection; (2, 5) Rectus muscle; (3) Uterine incision begun; (4) Upper part of the cervix and isthmus laid bare by dissection; (6) Retractor drawing the bladder down; (7) Fœtal ear; (8) Fold formed by sewing together the peritoneum from the uterus and parietes; (9) Peritoneum pushed up from the uterus; (10) Retractor drawing up the peritoneum.

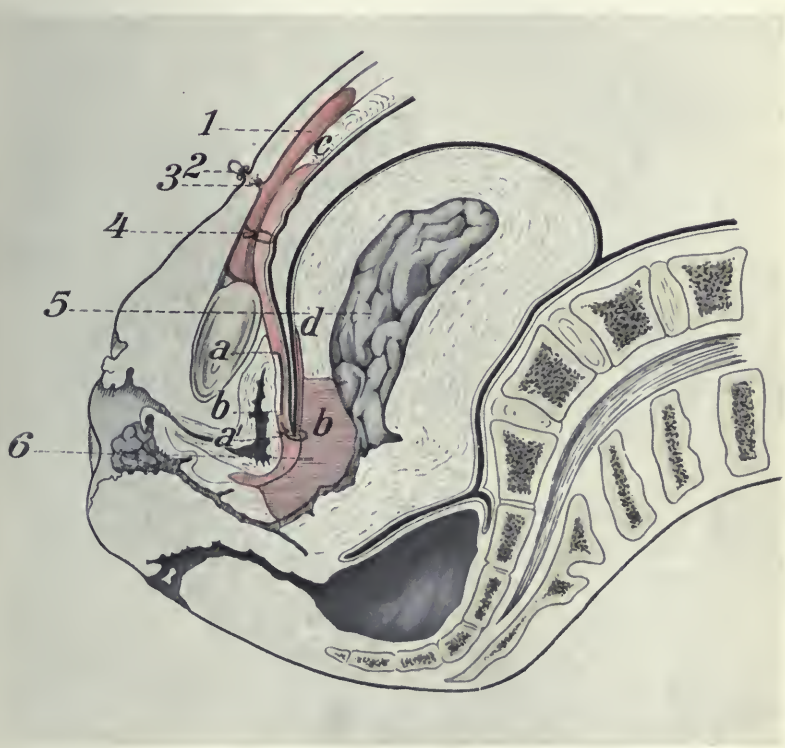
EXTRAPERITONEAL UTERINE SECTION—*continued.*

The abdomen is opened by Pfannenstiel's transverse incision. The peritoneum is dealt with according to Latzko's method (lateral displacement of the vesical peritoneum). Sagittal incision in the middle of the anterior uterine wall.



(1) Neighbourhood of upper wall of pubes; (2) Region of ureter pulled upward towards mid-line; (3) Lower angle of bladder pulled aside; (4) Rectus muscle drawn outwards by fixation suture; (5) Anterior wall of uterus laid bare by extraperitoneal dissection; (6) Sagittal incision for delivery in the middle line in uterus; (7) Peritoneal fold dissected up and drawn aside; (8) Left lateral ligament of bladder, upper end; (9) Upper flap of skin and fascia; (10) Pyramidal muscle; (11) Lower flap of skin and fascia; (12) Lower end of left lateral ligament of bladder; (13) Bladder drawn to right; (14) Retractor drawing aside bladder; (15) Level of reflection of peritoneum from bladder: peritoneal fold drawn to the right; (16) Right lateral ligament of bladder; (17) Median ligament of bladder.

EXTRAPERITONEAL UTERINE SECTION—*continued.*

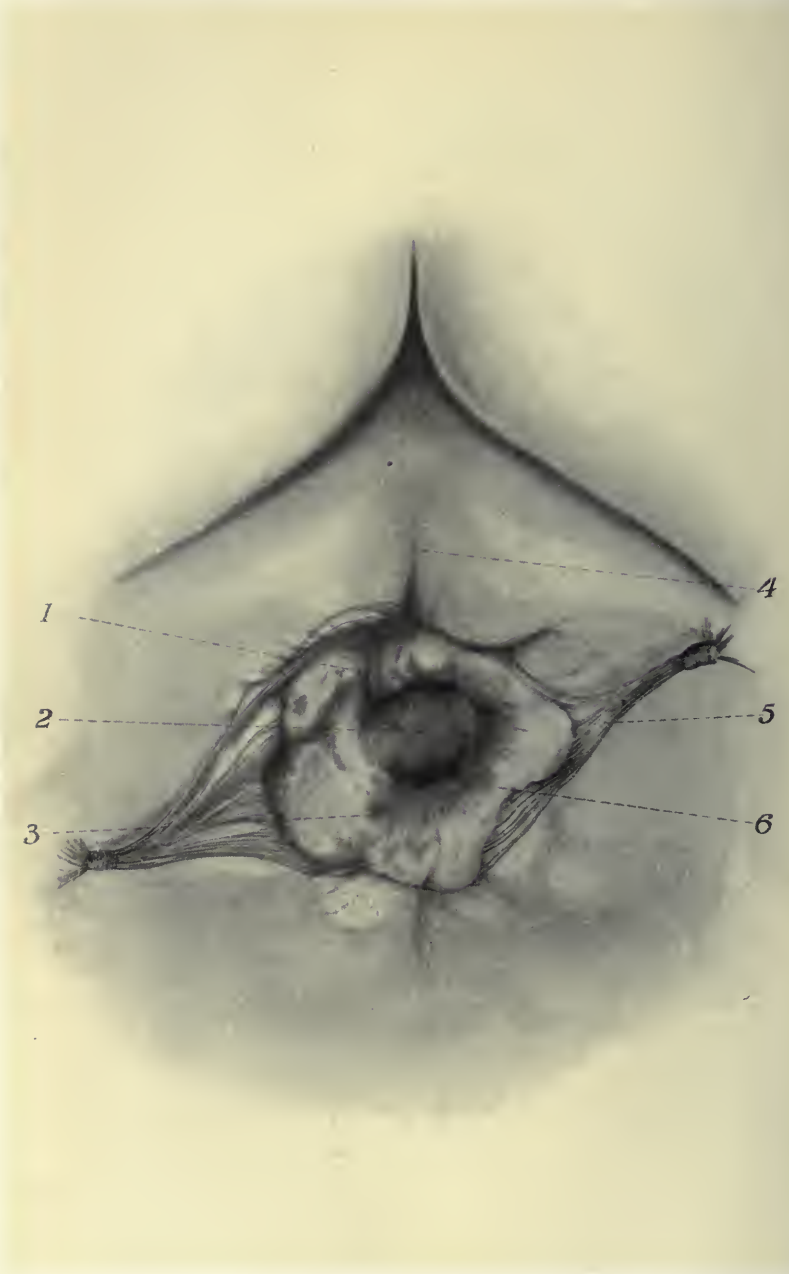


Anatomical relations of the wound after extraperitoneal uterine section.

(1) Sagittal division between the recti muscles; (2) Michel's clip on the transverse skin incision; (3) Suture of the transverse incision in the fascia; (4) Fixation of the parietal peritoneum to the deep surface of the rectus; (5) Packing in the cavity of the uterus; (6) Sagittal incision in the lower uterine segment; *a*, *b*, the vesical peritoneum left in place; *a'*, *b'*, newly-formed vesico-uterine fold formed by suture of the tissues covering the uterus and bladder; *a*, *c*, parietal peritoneum; *b'*, *d*, the loose peritoneum over the uterus.

EXTRAPERITONEAL UTERINE SECTION—*continued.*

Utero-abdominal fistula on the fifth day after delivery.



(1) Entrance to the cervix and vagina; (2) Hinder wall of the middle section of the cervix uteri; (3) Granulating front wall of cervix uteri; (4) Region of the upper margin of the pubes; (5) Bundle of interrupted sutures fixing edge of uterus to the skin; (6) Entrance to the cavity of the uterus.

Thus it will be seen that in my series there have been no fatalities which would not certainly have occurred with any other method of delivery.

Some women who suffered from slight infection of the wound would have been much more endangered by the classical operation. The advocates of the old operation consider that there are so many conditions precluding surgical intervention, that their brilliant mortality results do not afford a fair basis of comparison with those in my series. There are two widely different classes of case for which Cæsarean section may be employed, but the mortality results of these will not admit of comparison with one another. In the one group, which includes eclampsia, placenta praevia, cardiac failure, certain puerperal infections, etc., the cases must be carefully selected ; but in spite of this there is always danger of death. The other group consists of cases of contracted pelvis and conditions of obstructed labour which are not essentially dangerous to life.

There is no reason for any intrinsic difference between the dangers of an incision into the body of the uterus and one in the cervix, such difference being solely that of the position of the section.

The inclusion of cases of vaginal section which are doubtfully adapted to the old operation must involve a confusion of opinion. The comparative value of the two methods cannot be estimated in those cases in which one operation is possible while the other is not. An exact definition of the limits of the applicability of the extra- and intra-peritoneal operation is essential before making any statistical comparison of their results.

Extensive infection forms the sole contraindication to my operation. In all other cases the procedure I originally described is rigidly adhered to, and the attempt is made *to employ the extraperitoneal incision where hitherto the abdominal or vaginal Cæsarean section or symphysiotomy were employed.* This was found to be possible in every case by the use of a technique which can be performed practically outside the peritoneum, as well during the latter period of pregnancy as at the moment of parturition.

There is a detail to which I no longer attach importance, viz., whether the loose tissues between the bladder, peritoneum, and anterior uterine wall should be displaced upwards or to the side. I consider that the operation ought to be performed in the simplest manner possible which is adaptable to the largest number of cases. Usually I prefer to displace the parietal peritoneum upwards, together with the fold in front of the uterus (these being sewn together), and away from that covering the bladder, which is too firmly attached to allow of displacement.

I hold strongly that, wherever possible, the peritoneal cavity should be closed before the uterus is opened, because many labours, particularly those transferred to hospital by outside practitioners, involve the danger of infection. In every case I consider it an advantage to shut off the field of operation as much as possible from the

peritoneum. This may be accomplished either by peritoneal suture or other means, preferably by the former. Although many regard the peritoneal closure as an unnecessary complication, I am satisfied that it affords a very practical preventive of undesirable complications. This is particularly the case in emergency operations improvised under conditions very different from those in a hospital theatre. We may mention as examples: Movements in the field of operation associated with imperfect anæsthesia, particularly those of the intestines; or the necessity of temporarily turning from the operation to assist with some complication of anæsthesia or to attend to the child.

I regard the possibility of closing off the peritoneum, or leaving it open at will according to circumstances, as a great advance over the classical operation, and for this reason the extraperitoneal section deserves to be more widely used.

The cases of eclampsia, placenta prævia, etc., treated by extraperitoneal uterine section afford a valuable opportunity for comparing this procedure with the vaginal operation. Although I certainly hold that the vaginal operation is not one suitable for employment in general practice, yet there are many conceivable conditions which might justify it under such special circumstances; but generally speaking, *the extraperitoneal section of the uterus is an operation similar to that through the vagina, but presenting many advantages over the latter.*

One is able by this method to control the whole field of operation without pulling, dragging, and tearing; the tissues can be handled without tension, and the operator does not work in a constrained position in which the occurrence of brisk hæmorrhage will necessitate an immediate emptying of the uterus. Injury to the uterus and the behaviour of the scar during subsequent pregnancies are in my experience the same in both types of operation, and I therefore prefer the extraperitoneal operation to the vaginal, for placenta prævia, eclampsia, cardiac failure, and other cases which demand a rapid emptying of the uterus. I do not wish to discuss the *treatment of placenta prævia* as such, but merely to mention that the operator, in this condition, will have a great advantage in attacking it from above (in contrast with the vaginal section), particularly in respect of the important indications of saving the loss of blood and the difficult treatment of the very friable tissues.

If the conditions are such as to justify vaginal Cæsarean section, no objections can be raised on anatomical grounds to the performance of the incision from above. A tear in an operation area hidden from view is dangerous, and in order to overcome the results of this, which is the cardinal feature of the vaginal method, one must be prepared in the last resort to take refuge in the doubtful expedient of Momburg's method of arresting hæmorrhage. [Momburg's method consists in tying an elastic tourniquet tightly round the patient's abdomen, in order to arrest the circulation in the parts below.—E.W.H.G.]

Arguments against the extraperitoneal section are directed, not against cutting the cervix, but against the approach from above;

this objection only derives support from an erroneous confusion between the new extra- and the old intra-peritoneal operations. I do not maintain that an incision into the lower uterine segment has materially less danger for mother and child in cases of placenta prævia than the vaginal operation ; but I prefer the former method of delivery because it affords an approach from above by which I can operate at leisure, with the least possible loss of blood and with full anatomical exposure.

The functional results of the extraperitoneal uterine section, particularly in regard to subsequent confinements, have proved to be what one would have expected from the anatomical and physiological basis underlying its technique. The patients exhibit absolutely no difference in the course of their recovery, their condition on discharge, their capacity for work, or in their uterine functions, from women who have been naturally delivered. Observations of the functional conditions, particularly concerning the position and mobility of the uterus, taken at a later date, engender no misgivings. Five patients operated upon again became pregnant. Their pregnancy presented no abnormality. The confinements took place under our observation, some of them in the Hospital, others in the Polyclinic.

In two women with contracted pelves the operation was repeated. In one of these the abdominal wound of the first operation had healed badly because it had been infected. Nevertheless, at the second operation the uterus lay below the old scar, quite free, and the operation was carried out in the regular manner. Everything could be distinctly separated as on the first occasion. A preliminary closure of the peritoneum had been made with some difficulty. It was reopened in order to undertake the sterilization desired by the mother. This was easy. The intact tube was buried behind the peritoneum, a method which I prefer in all circumstances. In the second case where the operation was repeated, there was difficulty in separating the different layers of tissue, both in the abdominal wall and also between the uterus and bladder. This was effected at last by dissection, and an entrance made into the lower pole of the uterus in the same manner as in a recent case. The peritoneum was preserved intact, but probably the operation would have been easier without this effort.

In the first case no stretching of the old uterine scar was observed. In the second, after thirteen and a half hours' labour, the whole of the lower portion of the uterus, together with the parts right and left of the old scar (the remaining portion in both cases had completely disappeared), were so widely stretched that the thickness of the wall was only about 3 mm.

In the three remaining cases, both labour and delivery occurred in the natural way. The first woman was a 7-para, in whom at her last confinement the extraperitoneal section had been undertaken for placenta prævia. She bore a large living child after weak pains and with comparatively short labour. The only assistance afforded was the puncture of the amnion, which was clearly visible in the vulva

through the normally dilated os uteri. The afterbirth followed within thirty minutes of the birth of the child, after light pressure.

The second case was that of a 6-para woman who had been on the first occasion operated upon by Frank's method, and at the same time a sloughing tumour had been extirpated from the anterior lip of the cervix. The rickety pelvis manifested only a slight degree of contraction, the diagonal conjugate measuring 11 cm. The position was transverse. An anencephalic fœtus was delivered by turning and traction. The period after delivery was normal. The uterus felt normal except for the evident defect in the anterior lip of the cervix. The third case was a 6-para, on whom the extraperitoneal uterine section had been performed previously for placenta prævia. After a premature rupture of the membranes, and a labour lasting thirteen hours, she gave spontaneous birth to a living child weighing 2850 grams (6 lb. 4½ oz.), the first of twins. The second child, which lay in an oblique position, was also born naturally after the head had become sufficiently flexed. The periods of dilatation and expulsion occurred with as much regularity as could have been expected under the conditions of a prematurely ruptured amnion and a twin pregnancy. Recovery occurred without complications. The uterus felt perfectly normal. No evidence remained of the previous operation.

Only those cases in which no disproportion between the child and the pelvis serves to modify or hinder the dilatation of the soft parts, are of any use in coming to a conclusion as to the functional activity of the uterus which has been incised in its lower pole, during subsequent pregnancies and deliveries. My three cases stood the test, and two of these may have presented in the lower uterine segment the disintegrating effect, peculiar to the place of implantation, of placenta prævia. I have previously expressed the opinion that in the analogous conditions of vaginal Cæsarean section "the scar in its structure and its physical characteristics is much better adapted to the neck of the uterus than to its body." This opinion is strengthened by a consideration of the course of the cases of extraperitoneal section. The experience of the classical operation shows that a scarred uterus may rupture during subsequent pregnancies and labours by reason of the rigidity of its wall. Even a normal uterine body may tear under circumstances resulting from the overstretching of its lower pole. Therefore it must be assumed that there is a certain danger to the lower pole when the pregnant uterus is pathologically overstretched. The commonest cause of overdistention is afforded by a marked disproportion between child and pelvis. In two cases of contracted pelvis, the evidence afforded by the repetition of the operation proved the firm resistance of the scar in the lower uterine pole. It would not be surprising if, after an incision into the lower pole, a rupture should occasionally develop in an uterus overstrained by an insuperable obstruction, especially if the overstretching has not been prevented by timely operative intervention.

A case presenting pelvic contracture, where the uterus has previously been incised, demands that Cæsarean section should be carried out without delay. If, however, a rupture of the uterus has already occurred, the results would be less serious after the extraperitoneal than after the classical operation, owing to the more favourable situation of the rent. Repetition of the extraperitoneal operation involves certain difficulties in recent cases. These begin with the opening up of Pfannenstiel's incision, and continue until the uterus has been exposed. The adhesions must be overcome by force (often requiring to be cut), but in recent cases the pressure of the finger is sufficient to separate the tissues. It is more difficult to close the peritoneum than at the first operation. As this difficulty can be foreseen, the patient should be carefully instructed, previous to the second operation, as to the means necessary to ensure asepsis in the genital canal.

The extraperitoneal uterine section has up to now, in spite of hostile objections, amply fulfilled its first promise. At any rate I am encouraged by the experience already gained to undertake the further research: How far can the classical Cæsarean section, hebosteotomy, and vaginal Cæsarean section be replaced by section of the uterus from above in its lower segment? This holds good where there are no obvious signs of infection. In cases of a marked disproportion between the child and the genital canal, a manifest infection involves a much increased risk to the health and life of the mother in all kinds of operative delivery (Cæsarean section with its modifications as well as operations that widen the pelvis) with the exception of embryotomy. Even the surgical operation involved by existing infection, viz., *delivery through an utero-abdominal fistula*, signifies nothing more than an exceptional makeshift—possibly the best—where, for example, in spite of the danger to the life and health of the mother, a child is unconditionally desired, on the supposition that for the future all chance of a further conception is avoided. Operations in order to save the child, which are dangerous to the mother, can only be avoided by an improvement in conducting delivery which prevents the possibility of infection.

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CAISSON DISEASE. *Purves Stewart, M.D., F.R.C.P.*

Clinical observations in man, and experiments on animals, have demonstrated that the living body can be subjected to a pressure of several atmospheres without producing any noteworthy phenomena during such increased pressure, save perhaps in the auditory apparatus. Morbid phenomena, however, tend to appear when the atmospheric pressure is rapidly reduced again towards normal. Caisson disease is therefore, strictly speaking, a disease, not of compression, but of decompression. In divers, and in workers in deeply-sunk caissons, who ascend too rapidly to the ordinary atmosphere, the air which has been absorbed by the tissues and blood-plasma effervesces, as it were, and forms minute bubbles, which may act as emboli obstructing the circulation in the spinal cord and elsewhere. According to the position and numbers of these gas-bubbles, we have varying symptoms produced.

The most important constituent of this absorbed air is its nitrogen. McWhirter,[1] from an elaborate series of analyses of air and from spectroscopic blood-examinations amongst workers in the caissons of the New York subaqueous tunnels, finds that the loss of air by leakage in such subaqueous chambers is sufficient to maintain perfect ventilation, and that therefore carbon dioxide, carbon monoxide, and other gases do not accumulate in sufficient quantities to be worth considering as an etiological factor in caisson disease. For practical purposes, then, the direct cause of the malady is the presence of air-bubbles in the circulation, such air-bubbles consisting mainly of nitrogen.

Even under a normal atmospheric pressure, the different tissues vary in their power of absorbing nitrogen from the blood-plasma. Fatty and lipoid tissues, including the central nervous organ, absorb about six times as much nitrogen as is absorbed by water or by watery tissues. For each additional atmosphere of pressure the nitrogen saturation of the blood and tissues increases, about an hour being necessary to attain this condition of gaseous equilibrium between the blood and the tissues. If decompression occurs before an hour has elapsed, the tissues have not become fully saturated with nitrogen. On the other hand, so far as decompression is concerned, it is of no importance how many extra hours the patient has spent under pressure, so long as he has passed the first hour necessary for full saturation with the gas. The greater the amount of physical exercise taken by the caisson worker, the more rapidly does saturation of his tissues occur.

If decompression be carried out gradually, the nitrogen diffuses out of the tissues into the blood, and is excreted by the lungs. For every atmosphere of pressure, ten minutes at least should be allowed. The regulations of some countries (e.g., Holland) demand thirty minutes' decompression for each additional atmosphere. This is unnecessarily tedious. Of course, as Boycott, Damant, and Haldane[2] have shown, rapid decompression is tolerated without evil effects, so long as the atmospheric pressure has not been more than one or one and a half extra atmospheres, and decompression symptoms are unlikely unless the atmospheric pressure has been more than two or two and a half atmospheres. The lungs can only get rid of a limited amount of nitrogen in a given time, and since the diffusion of nitrogen from the tissues into the blood rapidly increases as the atmospheric pressure falls, we must not allow the pressure to fall more rapidly than will permit of the gas being removed from the tissues into the blood, and from the blood into the air of the pulmonary vesicles; moreover, this excretion of excess of nitrogen can only take place satisfactorily provided the circulation is efficiently carried on.

The Prophylaxis of decompression symptoms is of importance, both to the employé and to the employer. All divers or caisson workers should, therefore, as Plesch[3] has urged, be carefully examined beforehand as to their general physique and circulation, and all who are not organically sound should at once be rejected. Special watch should be kept for obesity, cardiac and vascular disease, anæmia, diseases of the central nervous system, œdema, renal disease, and ear troubles, especially obstruction of the Eustachian tubes. New employés should, if possible, be started at a low pressure, from which, in the course of four or five days, they are gradually promoted to the work of "high-pressure" men. Fatty and lipoid tissues absorb six times more gas than watery tissues; therefore a fat man will absorb more nitrogen than a thin, muscular individual.

The Symptoms of caisson disease commonly consist in muscle or joint pains. In more severe cases there are aural symptoms—deafness, giddiness, and tinnitus; sometimes actual rupture of the tympanic membrane. In the most severe cases of all, there are spinal cord symptoms, consisting in paraplegia, with or without anæsthesia. The worst cases of decompression paralysis occur in divers, who have to work on the bed of the ocean under high pressure, air being pumped down into their helmets, as for example, among the pearl-divers of Western Australia. Such cases have no decompression-chamber available, and, moreover, they are often at a long distance from skilled medical aid. Amongst pearl-fishers, therefore, numerous severe cases of diver's paralysis occur. Buck[3] has seen no fewer than 200 cases within the years 1900 to 1908; sixty of these patients were dead before being seen by him, and in these cases post-mortem examinations were made. To the naked eye, the chief facts visible at the autopsies were as follows: (1) Signs of asphyxia: the heart, thoracic viscera, and large veins of the neck being engorged with dark liquid blood,

showing that in rapidly fatal cases death is due to failure of respiration. (2) The spinal cord has a most striking appearance. The cord has a curious "teased" surface on transverse section, looking semi-disintegrated, as if stippled with a needle, doubtless owing to air-bubbles. Together with this teased appearance, hæmorrhages are usually present, and may occupy the entire transverse area of the cord at the affected level. The cervical enlargement is the part most frequently affected.

In all cases of diver's paralysis, the most constant sign is retention of urine, requiring catheterization. In slight cases it may be the only symptom calling for attention. So much is this so, that according to Buck, no diver considers his outfit complete without a soft catheter. In divers who are brought too rapidly to the surface, the symptoms do not usually supervene until the patient has removed his diving-dress. In other cases, he may rapidly become paraplegic, or may even drop suddenly as if shot, with or without unconsciousness. Death in fatal cases occurs in from one hour to two days. In divers where no decompression chamber is available, the symptoms may be prevented by a slow and gradual return to the surface.

TREATMENT.—Once the symptoms of caisson disease have supervened, the only efficient treatment is by prompt recompression in a specially constructed chamber, the pressure being raised to the same degree as that in which the patient had previously been working. By this means the bubbles of gas in the tissues are reabsorbed into the blood. Decompression is then gradually carried out.

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CALCULUS. (*See* KIDNEY *and* URETERS.)

CANCER.

Thymus Gland in (*page* 55); inoperable, **Radium** in (*page* 85).

CAROTID, LIGATION OF. (*See* ARTERIES, SURGERY OF.)

CATARACT. *A. Hugh Thompson, M.D.*

Slight Opacities of the Lens.[1]—In very many cases slight opacities of the lens are stationary, and in others they increase at such a very slow rate that it may be many years before vision is seriously impaired. The slightest form of stationary lens opacity consists of a few minute dots or bubbles, only to be seen with a high convex lens behind the ophthalmoscope. These are congenital, very common, and of no pathological significance. Next to these come various forms of congenital localized lens opacity which have no tendency to increase, and interfere with vision but slightly. Among these are cases of slight lamellar "cataract"—though these are probably not strictly speaking congenital—where the opacity of the circumnuclear zone is unmistakable, but so slight that the details of the fundus are clearly visible with the ophthalmoscope, and the vision is not reduced beyond $\frac{6}{12}$. These cases are generally stationary, and, as the near vision is

as a rule better than the distant, they are able to get on at many occupations quite well, can read with ease, and do not call for operation. Allied to these cases are those of so-called "Coppock" cataract, congenital circumscribed opacities in the central part of the lens, often occurring in several members of the same family, and named after one particular family in which they were first discovered. In many of these cases the opacity, being very slight, has only been ascertained to exist by those who have examined as many members of the affected families as possible, in order to investigate the nature of the hereditary transmission of the defect.

In people past middle age it is very common, on dilating the pupil for a complete examination of the fundus, to find small radial striæ in the periphery of the lens which do not encroach on the pupil when that is in its normal condition, and therefore do not interfere with vision. In these cases we should always take careful notes both as to the condition of the fundus and as to the extent of the opacities. We should not, however, tell the patient that he has got "cataract." The fact is that many of these cases remain stationary for several years, or even for the life of the patient. On the other hand, some of them increase, and mature with comparative rapidity. Even when the opacities have begun to encroach on the pupillary area it may sometimes be years before the vision is very seriously injured, and if the second eye is unaffected there is no use in talking about an operation. Only in cases when the better of the two eyes is so seriously impaired that the patient is unable to read or to pursue his usual avocations, has the time come to consider the matter.

Intracapsular Extraction.—The brilliant results of this operation in cases that do well are due to the fact that there is no subsequent trouble either with soft matter or with capsule. On the other hand, the comparatively large amount of pressure necessary to rupture the suspensory ligament and express the lens with its capsule intact can only be used with an increased risk of evacuating, not only the lens, but some of the vitreous also. The essential points about the operation—Smith's operation—as described by Birdwood,[2] one of his disciples, are: (1) The incision must be large—very nearly, but not quite, half the corneal circumference. (2) The pressure of the speculum must be removed before the actual expression of the lens is attempted, and its place is taken by a trained assistant, who elevates the upper lid by means of a strabismus hook, holding it well away from the eyeball. (3) Pressure is made by the operator with the point of a strabismus hook on the lower end of the lens—he may or may not use in addition a spoon in the other hand. It is on the extent and direction of this pressure that the success of the operation mainly depends. Sometimes the expulsion is easy. At others it is not, and it is necessary to press so hard against the lower end of the lens, that in getting dislocated from the suspensory ligament it is turned upside down, and emerges from the incision bottom end foremost. To effect this without an escape of vitreous would appear to be difficult, and, as might be

expected, this is by far the most frequent complication of this operation.

Captain Lister[3] has examined 98 eyes operated on in Smith's hospital, in all of which a loss of vitreous was noted to have occurred at the time of the operation. The time which had elapsed since operation was on the average rather over three and a half years. If, therefore, a loss of vitreous makes an eye more likely to go wrong after recovery from the operation than it otherwise would be, these cases might have been expected to furnish evidence of the fact. No such evidence was forthcoming, however. On the contrary, the vision in most cases was remarkably good. In 61 cases in which there was no corneal opacity and no disease of the fundus, and in which no capsule was left behind, vision was $\frac{6}{6}$ or better in 56 cases, and $\frac{6}{9}$ in the remaining 5. Not a single case of retinal detachment was found. Leaving out of account cases of fundus disease in no way connected with the operation, the only cases which had not done so well were a few in which the capsule of the lens had been left behind owing to bursting at the time of operation. So far as a slight loss of vitreous goes, therefore, it does not appear to cause any appreciable proportion of failures. When the loss is large it is different, and where the eye is highly myopic a vitreous loss would almost certainly predispose to detachment of the retina. In spite of Smith's good results in his own hospital, it is too soon to recommend the adoption of his operation indiscriminately. Reports from other operators are not nearly so favourable. Even Smith himself, when operating in the clinic of a colleague at Bombay, seems to have had an extraordinary run of ill luck, for out of 23 extractions performed in one day, the capsule was ruptured during the operation in 5 cases, in 4 of them tags of capsule being left in the wound; and in none of these 23 cases was the visual result better than $\frac{6}{36}$.

In replying to the article by Kilkelly,[4] in which these bad results are detailed, Smith says that if he had for a moment been led to think that these cases were meant for publication, he would never have accepted the conditions.[5] At his own hospital Smith, according to statistics published in 1905, is said to have had over 99 per cent "first class results" in a series of 2616 intracapsular operations; but what exactly is meant by "first-class results" is not clear. They appear to have included 4·28 per cent of cases where the capsule ruptured and was left behind.[6] After reading what both sides say, the judicious operator will probably be inclined to reserve this operation for special cases of unripe cataract, and, in performing it, be prepared to alter his procedure to the ordinary one in any case in which the lens does not present easily.

An alternative method for dealing with cases with soft cortex is irrigation. McKeown's apparatus for this purpose is unnecessarily complicated. According to Bishop Harman,[7] a simple apparatus is quite as effective and, being far more easily sterilized, safer. The following are the essentials: A small glass reservoir with a snout

to which a piece of six-inch indiarubber tubing is attached. At the end of the tubing is the nozzle of an Anel syringe. The nozzle is 28 mm. long; 5 mm. from the end it is bent into an angle of 45° with the stem. The orifice is slit-shaped, 2 by 0·5 mm. The reservoir contains normal saline, and the whole apparatus must be boiled in a sterilizer before use. As soon as the reservoir is lifted above the nozzle the solution begins to flow. The end of the nozzle is inserted into the anterior chambers, but only kept in position by the hand on the india-rubber tubing. In this way any sudden movement on the part of the patient is not likely to lead to bad results. The temperature of the solution should be that of the body. It is used to evacuate the cortical soft matter that remains behind when the nucleus is got rid of.

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CATGUT, PREPARATION OF. *Priestley Leech, M.D., F.R.C.S.*

Yelverton Pearson[1] says that, so long as surgeons employ a simple aseptic catgut, so long will they be dissatisfied with their results. It is much better to have it impregnated with some reliable antiseptic, and for this purpose iodine has proved the most reliable. When slower absorption is required, he recommends the use of iodine-formalin catgut, prepared as follows: The gut is prepared as usual with iodine and alcohol, placed in a sterile jar, and washed with either sterile water or weak carbolic solution; then it is placed in a 3 per cent formalin solution for from twenty-four to forty-eight hours, according to the thickness of the gut; washed in running water for a few hours to remove the formalin, and then placed in 50 per cent alcohol containing 0·5 per cent iodine and 5 per cent glycerin. It can be used directly from this solution. Pearson suggests that if formalin-prepared catgut, be used, by placing it in iodine solution, the iodine will not penetrate the gut, owing to the formalin having hardened its outer portion.

Steward,[2] for the last two and a half years, has used the ordinary formalin catgut which is placed in 1 per cent solution of iodine in water for ten days. At the commencement of the operation, skeins of the required size are picked out of the stock jars with sterile forceps and placed in carbolic acid 1–20 till needed. It has a good tensile strength, and resists absorption. For skin sutures, No. 000 is used; for intestinal work, No. 00; for muscles, aponeurosis, and tendons, Nos. 1 to 2; this latter is not quite absorbed in a month. Dickie[3] recommends the use of raw catgut prepared by the iodine method and then dried, as introduced by Moschcowitz. He wraps the catgut in special glass slides with notches cut at the end, and previously sterilized. A length of catgut is wrapped slackly on each of the slides, which are placed in a jar and covered with the iodine solution; on the tenth day the solution is poured off, the slides are allowed

to drain, and are placed in sterile test-tubes plugged as in bacteriological work; the tubes are turned upside down for a few days to allow of any moisture draining into the plugs. Prepared thus, it remains septic for years, does not kink, and is not brittle.

References.—[1]*Brit. Med. Jour.* Dec. 25, 1909; [2]*Ibid.* Oct. 1909; [3]*Ibid.* Jan. 15, 1910.

CEREBROSPINAL MENINGITIS. *E. W. Goodall, M.D.*

Clinical.—Mestrezat,[1] as the result of the examination of the cerebrospinal fluid in cases of cerebrospinal fever, concludes that albumin is present to the amount of upwards of 3 grams per 1000; sugar, from 0·12 to 0·25 grams; chlorides, between 6 and 7 grams; "extract," usually over 13 grams. Normally, albumin is present to the amount of 0·13 grams per 1000; sugar, 0·53 gram; chlorides, 7·35 grams; and "extract," 10·80 grams. In the fluid from a case of tuberculous meningitis the amounts are: albumin, 1 to 2 grams; sugar, 0·20 to 0·30; chlorides, 5·50; and "extract," 10·50.

According to Salebert and Thubert,[2] the condition of the urine in cerebrospinal fever differs from what usually obtains in acute febrile diseases. During the acute period the amount of urea and phosphates excreted is much above the normal, while the amount of chlorides is much below. The total amount of urine is notably increased (paradoxic urinary syndrome of Loeper and Gourand[3]). When defervescence takes place, the urea and phosphates decrease and the chlorides increase to normal, rather suddenly. In prolonged cases the amounts of these substances excreted vary with the temperature in the directions indicated; but in some cases the amount of urea remains high, even though the temperature has fallen to normal and the symptoms generally have much improved. This is to be taken as an indication that the improvement is apparent and not real, and that further injections of serum (by lumbar puncture) should be given. In a few cases there is appreciable glycosuria early in the disease.

Treatment.—Arnold Johnston[4] gives details of two cases of cerebrospinal fever treated with intravenous injections of **Soamin.** Both the cases were very severe. Three to four grains were injected into the median basilic vein every other day in one, and daily in the other cases, until the temperature remained normal. Both patients made a good recovery. One patient had seven injections in all.

Clinically, the cases are interesting because they showed an intermittent type of fever, rigors with a high temperature occurring every other day, and the temperature falling to normal on the intervening day. The disease thus simulated a tertian fever. (See also *page* 13.)

The intraspinal injection of an **Antimeningococcic Serum,** prepared by immunizing horses against the meningococcus, continues to yield results more favourable than any other treatment. In a discussion at the meeting of the American Medical Association, Simon Flexner[5] summarized the results of cases treated with the serum prepared by himself and Jobling up to June, 1909. Of 712 cases treated, verified

by bacteriological diagnosis, 224 died, a case-mortality of 31·4 per cent. The mortality was highest in children under one year, 43·3 per cent; lowest in those between five and ten years, 15·9 per cent. The earlier the serum is injected, the more favourable the result; 25·3 per cent was the mortality amongst those injected on the first three days of illness; the rate rose to 42·1 per cent in those injected later than the seventh day. In the discussion referred to, Flexner stated that there were two symptoms which were likely to persist after the disease had entirely yielded to the treatment, namely, rigidity of the neck, and the Kernig sign. Other things being favourable, they could be disregarded, and might persist even for several weeks, and gradually disappear. Apparently, certain strains of the diplococcus were more resistant to the destructive and inhibiting influence of the serum than others. He further said that he was confident the inflammatory exudate sometimes formed in inaccessible parts of the meninges, or in deeper parts of the brain which the serum could not reach. In cases of hydrocephalus the obstruction at the base of the brain often prevented the serum from reaching the cerebral meninges and ventricles, where the exudate was contained. Cushing, of Baltimore, first carried out intraventricular injection of the serum in children in whom this obstruction existed, after trephining the skull; and in young children it was possible to make the injection through the anterior fontanelle; but up to that time, in no case of the kind, so far as he knew, had the patient recovered. He thought the operation justifiable, since these cases always terminated fatally [if left to themselves].

Flexner's opinion has been justified by the case of a female infant, two months old, reported by Fischer.[6] The child was admitted to hospital on Oct. 2nd, 1909, having been suffering from cerebrospinal meningitis since Sept. 29th. Lumbar puncture on Oct. 2nd gave a fluid which did not show meningococci when examined bacteriologically. On Oct. 7th, 10th, and 18th, lumbar puncture was performed, but no fluid could be obtained ("dry tap"). As rigidity, opisthotonos, fever, and twitching were marked, on Oct. 20th it was decided to tap the ventricles of the brain. "About 15 cc. of turbid fluid containing pus was withdrawn from the right lateral ventricle. Smears showed intracellular Gram-negative meningococci. The ventricles were then irrigated with normal saline solution at a temperature of about 105° F. The excess of fluid was allowed to drain out through the needle, and 25 cc. antimeningitis serum were slowly injected into the ventricles. During the injection of the serum the infant changed in colour from a waxy pallor to a uniform red flush all over the body." On Oct. 21st the operation was repeated; 40 cc. of fluid were withdrawn, and 20 cc. of Flexner's serum injected. On Oct. 22nd the child's condition was still "very poor," and the prognosis was bad. "On Oct. 23rd a lumbar puncture was performed in the fourth lumbar interspace, resulting in a dry tap. A second needle was then inserted in the third interspace, the first needle being allowed to remain *in situ*. Through the second needle, 15 cc. of Flexner's serum were injected, about 3 cc. of which

returned through the first needle. Then 15 cc. were injected through the first needle, about 5 cc. of which returned through the second needle, thus proving that both needles were in the canal, and that there was a clear passage from one needle to the other. In all, the infant retained in its spinal canal from 20 to 25 cc. of serum." On Oct. 25th 5 cc. of slightly cloudy fluid were withdrawn by lumbar puncture. Fifteen cc. of serum were injected into the ventricles, though no ventricular fluid could be withdrawn. On Oct. 28th lumbar puncture resulted in a dry tap. The child then slowly improved, and appeared to be well by Nov. 20th, when a lumbar puncture was dry. On Nov. 22nd the lateral ventricles were punctured and 50 cc. of clear fluid withdrawn, free from meningococci.

In order to reach the right lateral ventricle, the needle is made to enter at the right angle of the anterior fontanelle. The needle, which is "about 8 cm. (3¼ in.) in length, is introduced downward and toward the median line at an angle of about twenty degrees, to the depth of about 4·5 cm. (1¾ in.). The needle enters the lateral ventricle near the median line, presumably through the second frontal convolution."

In older children the ventricle can be reached by the following method (Kocher's): "A small patch of scalp is shaved, and a one-inch linear incision made about 3·5 cm. (1⅜ in.) from the antilongitudinal line, and about 5 cm. (2 in.) anterior to the sulcus centralis; the bone is exposed and penetrated by a Doyen perforator, followed by a burr, which leaves a cup-shaped fossa, and gives sufficient exposure to the dura to assure the operator that there is no large underlying cortical vessel. The hollow exploratory needle, which should have a blunt point with openings upon the side, is then gently inserted into the second frontal convolution perpendicular to its surface, and at a depth of from 4 to 5 cm. (1½ to 2 in.) readily finds the ventricle. . . . If pus is present, the ventricle should be drained and washed with normal saline solution until the fluid returns clear. Our next step is to inject not more than from 20 to 25 cc. of antimeningitic serum. This procedure should be repeated daily until tapping of the ventricles yields a negative result. If symptoms of intracranial pressure are noted immediately after the injection, and vomiting or convulsions appear, then it is better to postpone the aspiration and washing of the ventricles plus injection of serum, to once in forty-eight or seventy-two hours, instead of daily." The writer recommends aspiration of and injection of serum into the ventricles when lumbar punctures result in dry taps and the symptoms of intracranial pressure continue (as in the case reported).

John Ritchie[7] relates an interesting case in which a patient, a man aged twenty, was apparently cured of a relapsing cerebrospinal meningitis by the employment of a vaccine. The patient had a primary attack and five relapses, from June 19th to Dec. 31st. Though treatment by the intraspinal injection of serum gave great benefit in the attacks of meningitis, it did not prevent them from recurring. Accord-

ingly, on Jan. 7th, seventeen millions of meningococci, prepared from cocci derived from the patient's own spinal fluid, and killed by the addition of 0·25 per cent of pure carbolic acid, were subcutaneously injected. A second injection of the same strength was given on the 16th. On the 24th, thirty-four million, and on the 31st, fifty-one million cocci were injected. There were no further attacks of meningitis, and the patient left the hospital well on March 1st. Ritchie supposes that some focus of infection was remaining somewhere in the cerebrospinal meninges.

Other testimony to the efficacy of intraspinal injection of serum is given by Bagley[8] and Dopter.[9] The former used Flexner and Jobling's serum; the latter gives an account of cases treated by a serum prepared by himself. There were 402 cases treated in different places in France. There were 66 deaths, a mortality rate of 16·4 per cent. Details of some of the French cases will be found in a paper by Conti.[10]

PROPHYLAXIS.—This question is thoroughly discussed in an official publication of the Bulletin of International Hygiene, Paris, translated by De Méric.[11] According to this publication, there are reasons for believing that the only method by which the disease is spread is by direct transmission from one person to another. The micro-organism which is the cause of the disease (Weichselbaum's *Diplococcus intracellularis*) is found in the naso-pharyngeal cavities, and can be expelled in the secretions of those regions and in the saliva, in the acts of talking and coughing. Therefore, from the point of view of prophylaxis, all objects which have been contaminated with the secretions mentioned above should be carefully disinfected, not only during the course of the disease, but for some time after the patient has recovered. Those in attendance upon the patient should be careful not to receive in their faces any of the liquid expelled from his mouth.

The following statement is made in the publication from which we are now quoting: "Contamination is effected by means of the mouth and nose; the initial manifestation is generally more or less accentuated inflammation of the mucous membrane lining the first portion of the respiratory tract. These symptoms may, and often do, pass off without further trouble, so much so that one seems to be dealing with meningitis which is but a complication of a specific rhino-pharyngitis."

This rhino-pharyngitis may be slight and hardly noticeable, and the brain and spinal cord may not become infected. Persons suffering from such slight manifestations of the meningococcus may become the cause of well-marked attacks of cerebrospinal fever in others, and they may act as sources of infection for some time after they have recovered from any slight indisposition. They may, in short, act as "carriers," a class of persons who are now recognized to play a more or less important part in the dissemination of several of the infectious diseases. The number of "carriers" may be considerable. During an epidemic which broke out in the Ruhskohlen district in the spring of 1907, investigation was made of the nasal mucous membranes of healthy persons who had lived in the neighbourhood of cerebrospinal

fever cases. Of 3,154 persons who were examined during the months March to August, 465 were found to be "carriers." The highest percentage of "carriers" was found when the epidemic was at its height (March and April, 30·1 and 23·7 per cent); the proportion became smaller as the epidemic waned, and was only 5.5 per cent in August. The incidence of "carriers" was especially high in families in which cases of cerebrospinal fever had occurred (50 per cent during the height of the epidemic).

It becomes, therefore, a question how a "carrier" should be treated. It is advised that he "should be warned that he constitutes a real danger; that this danger can be minimized by his taking certain precautions, such as: never to go near children; not to expectorate on the floor; to be careful to see that all familiar objects with which he comes in contact (table utensils, handkerchiefs, etc.), are soaked in boiling water before coming into the hands of other persons." "Carriers" should be examined periodically for the meningococcus till they are free. The occurrence of rhinitis amongst the early symptoms of the disease is also alluded to by Fischer,[12] who writes as follows: "Rhinitis with catarrhal discharge from the nose is sometimes an early symptom. . . . Rhinitis is frequently found in the abortive type of the disease."

REFERENCES.—[1]*Rev. de Méd.* Mar. 10, 1910; [2]*Ibid.*; [3]*Presse Méd.* Feb. 1, 1905; [4]*Brit. Med. Jour.* Jan. 22, 1910; [5]*Jour. Amer. Med. Assoc.* Oct. 30, 1909; [6]*N.Y. Med. Jour.* Mar. 26, 1910; [7]*Edin. Med. Jour.* June, 1910; [8]*N.Y. Med. Jour.* Mar. 10, 1910; [9]*Ann. Inst. Past.* Feb. 25, 1910, in *Lancet*, May 14, 1910; [10]*Gaz. deg. Osped.* Feb. 6, 1910; [11]*Med. Press*, Mar. 9, 1910; [12]*N.Y. Med. Jour.* Dec. 18, 1909.

CERVICAL RIB. *Purves Stewart, M.D., F.R.C.P.*

The occasional presence of a cervical rib in man is more than a mere anatomical curiosity. Within recent years the condition has assumed considerable clinical importance, since it has not infrequently been found associated with definite signs and symptoms. In most cases, the possessor of a cervical rib is unaware of its existence. Curiously enough, the symptoms, if they occur, rarely begin before adult life. Various explanations have been offered for this delay. For example, the onset has been ascribed to loss of padding over the rib owing to emaciation; to tuberculous affections of the apex of the lung on the same side as the cervical rib, as in Nickol's[1] four cases; to trauma from violent exertion, as in swimming, etc.

Goodhart[2] has recently discussed the symptomatology of cervical rib, basing his paper on a case observed by himself. The symptoms produced by a cervical rib, even in bilateral cases, are generally confined to the side of the larger rib. Cervico-dorsal scoliosis is nearly always present, the convexity being towards the side of the extra rib, or of the larger rib in bilateral cases. Apart from local evidences of the supernumerary rib, such as a swelling above the clavicle, subsequently shown by radiography to be a cervical rib, there may be nervous or circulatory symptoms. The circulatory symptoms, when present,

consist chiefly in diminution of the radial pulse on the affected side, with tingling, weakness, pallor of the hand, and even gangrenous spots on the fingers, owing to compression of the subclavian artery between the normal first thoracic rib and the supernumerary cervical rib. Last year I myself had a case of this kind in a middle-aged woman at the Westminster Hospital, on whom my colleague, Mr. Tubby, operated for removal of the rib, and in her case we found the subclavian artery thrombosed. Osler[3] records three somewhat similar cases in which the patient had tingling, throbbing, and congestion of the hand on slight exertion. In only one of these was a radiograph taken, and here a cervical rib was demonstrated. No operation was undertaken.

More commonly the phenomena are referable to pressure or traction upon the lowest roots of the brachial plexus, inasmuch as the eighth cervical and first thoracic nerves embrace between them the neck of the supernumerary rib. The symptoms may be sensory or motor. Sensory symptoms consist in neuralgic pain or dragging feeling in the upper limb, especially in the ulnar fingers. Together with this, there is often an area of altered cutaneous sensation—anæsthesia or hyperæsthesia—especially in the region of the first thoracic and eighth cervical root-areas, i.e., along the ulnar border of the forearm, and in the two ulnar fingers and corresponding part of the hand, back and front. The motor phenomena consist in weakness of the affected limb, especially of the hand. Part of this may be due to deficient blood-supply, as in my own case above referred to, where the patient was unable to raise the limb oftener than two or three times in succession without pain and weakness. But, more often, the weakness is associated with localized muscular atrophy, confined usually to the intrinsic muscles of the hand, i.e., the muscles supplied by the first thoracic root.

As in other diseases, the presence of a cervical rib should not prevent us from looking for other abnormalities in the patient's nervous system. Thus Oppenheim[4] has emphasized the view that cervical ribs are amongst the so-called stigmata of degeneration, and may therefore be associated with nervous maladies of degenerative origin. For example, he has recorded two cases of syringomyelia associated with cervical ribs.

The TREATMENT of cervical rib, if it is causing symptoms, consists in its **Operative Removal.** Numerous cases have now been operated on. It is important to remove, not only the abnormal rib, but its periosteum as well, lest, from callus formation and subsequent pressure, a second operation be rendered necessary.

REFERENCES.—[1]Inaugural Dissertation, Leipsic, 1906; [2]*Amer. Jour. Med. Sci.* Nov. 1907; [3]*Ibid.* Ap. 1910, p. 469; [4]*Lehrbuch d. Nervenkrankh.* 5 Aufl. 1908, Bd. i. s. 497.

CHANCRE. *C. F. Marshall, M.Sc., M.D., F.R.C.S.*

Reute[1] recommends hot irrigations (50° C.) with a 0·1 per cent solution of **Potassium Permanganate** in the treatment of simple chancre. After one or two irrigations, Ducrey's bacillus was no longer found in the sores, whereas it was still present after fourteen days'

treatment with iodoform. The permanganate is said to cause rapid healing of the sores, reduction of phimosis when present, and avoidance of buboes.

Ruggles[2] reports good results from the treatment of phagedænia, chancres, and chancroids by means of **Hot Air,** applied by a modified Tallermann apparatus.

REFERENCES.—[1]*Ther. Gaz.* Dec. 15, 1909 ; [2]*N.Y. Med. Jour.* Jan. 22, 1910.

CHILBLAINS.

(*Vol.* 1910, *p.* 17)—**Calcium Lactate** in 15-gr. doses, with 1 min. of tincture of capsicum and 1 oz. of chloroform water, three times daily, is recommended by A. P. Luff.

CHLOROSIS. *George Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Melland[1] discusses treatment. Acting on the view of Haldane and Lorrain Smith that the condition is not an absolute diminution of hæmoglobin but an excess of plasma, he has used the following measures. The bowels are stimulated to eliminate fluid by small doses of **Magnesium** or **Sodium Sulphate. Citrate of Caffeine, Diuretin** or **Theosin Sodium Acetate** is given to stimulate the kidney. Whichever is used should be combined with **Digitalis.** Loss of fluid by the skin may also be encouraged by the administration of **Jaborandi,** or by **Hot Water** or **Vapour Baths.** At the same time the intake of fluid should be restricted, and as salts have the power of causing retention of fluid in the body, as little salt as possible should be taken with the food. As patients improve, they lose in weight. Although theoretically it should be possible to cure chlorosis by these measures alone, there is no doubt that improvement is very slow until **Iron** is added to the treatment. Measures directed towards the removal of fluid act best in cases in which the face and loose tissues have a "puffy" appearance.

REFERENCE.—[1]*Brit. Med. Jour.* Dec. 11, 1909.

CHOLERA. *J. W. W. Stephens, M.D.*

L. Rogers[1] records his extended experience of the use of transfusions of **Hypertonic Saline Solutions.** The great concentration of the blood in cholera is seen on opening a vein, and a blood-count will show 7 to 8 million red cells per cmm. There is a definite relationship between the loss of fluid from the blood and the severity of the disease, which in severe cases is so great as to indicate treatment directed towards lessening this concentration and restoring the failing circulation. A still more valuable guide is the blood-pressure, which, if it falls to below 70 mm., is an indication for intravenous injections. Marked restlessness or cramps, especially if accompanied by cyanosis, also require this treatment. In injecting saline, an attempt to get the blood-pressure above 100 mm. should be aimed at. In order to effect this, not less than four pints in adult males, less in females, are required. Saline injections may be given in several ways :—

Rectal.—If the pulse is still fair, a pint of saline every two hours will often prevent collapse. If, however, the pulse is only just perceptible,

and the blood-pressure bordering on 70 mm., continuous rectal injections are advisable, viz., at the rate of one ounce a minute (three pints an hour). The rate of flow can be regulated by a stop-cock.

Subcutaneous.—The drawbacks to this method are the difficulty of getting in rapidly sufficient fluid, and the frequency with which abscesses result. If used, however, the slow continuous method is most likely to be successful.

Intra-abdominal.—The author has devised a special cannula for intraperitoneal injections, and the method promises to be valuable.

Intravenous.—In all really severe cases of collapse, this method alone can be relied upon to save the patient. Normal saline solutions, though effective to some extent, have not had the result that was anticipated. Now, in cholera the chlorides are diminished in amount in the blood, 0·6 or 0·7 against 0·8 or higher in Bengalis. The author, instead of normal saline, introduced the practice of injecting hypertonic solutions, and found that the fall in chlorides was prevented, and, moreover, that if the chlorides were raised to 1 per cent or over, collapse rarely occurred. The author now uses 120 gr. of salt to the pint and 3 gr. of calcium chloride to the pint in the first three or four pints only. He has treated 278 cases, with a death-rate of 33·8 per cent, against 61 per cent for the previous six years.

Uræmic Symptoms.—In the author's cases all those whose blood-pressure remained for several days below 100 mm. died with uræmic symptoms, while only one died with a pressure of 105 mm. or over. In order to raise the blood-pressure in the later stages the following treatment is advised: (1) **Normal Saline** ½ to 1 pint containing 5 min. of a 1–1000 **Adrenalin** solution, is given per rectum every two to four hours. (2) **Dry Cupping** over the loins morning and evening. (3) **Digitalin** $\frac{1}{100}$ gr. subcutaneously twice a day; or if this fails, **Strophanthin** $\frac{1}{100}$ gr. intravenously.

R. Macrae[2] reports on the cause of the fatal outbreak of cholera among the nurses of the Presidency General Hospital, Calcutta. The source of contamination was traced to certain servants (*masalchis*) who, although apparently in good health, were proved to be vibrio-carriers. The infection was conveyed from their bowels through ablution on to their hands, and thence on to various articles handled by them, such as ice, dishes, etc.

A. A. Hymans,[3] discussing Emmerich's theory that cholera is a nitrite poisoning, comes to the conclusion that there are no tangible facts in favour of the view.

L. Rogers[4] strongly advocates the use of **Permanganates** as a simple curative treatment of cholera. They are given in two different ways: (1) In solution, ½ to 1 gr. to the pint at first, on account of the unpleasant astringent taste, then increasing the strength rapidly up to 4 to 6 gr. to the pint. Calcium permanganate is the best salt to give, as it is less astringent. (2) In pills: 2 gr. are mixed with a little kaolin powder and vaseline. The pill is coated with salol 1 part, gum sandarac varnish 5 parts, or with keratin. One pill is given every quarter of an

hour for the first two hours, and then every half-hour until the stools become coloured green and less copious—usually in about twelve hours. Barley-water is given to maintain the strength. On the second day eight more pills are given, and in severe cases this is repeated on the third day. The mortality, which was reduced by the author's method of injection of hypertonic saline solutions to nearly one-half, has now been reduced to about a third of the old rate. In cases suffering from collapse, with a blood-pressure below 70 mm., transfusions must be used in addition.

M. M. Basil[5] has frequently used **Creolin** with good results. Four to six drops are made into a bolus with flour, rolled up in a cigarette paper, and swallowed.

References.—[1]*Ther. Gaz.* Nov. 15, 1909; [2]*Ind. Med. Gaz.* Oct. 1909; [3]*Berl. klin. Woch.* Nov. 8, 1909; [4]*Brit. Med. Jour.* Sept. 24, 1910; [5]*Ibid.*

CHOLESTEATOMA. (*See* Ear, Diseases of.)

CHORDEE.

(*Vol.* 1910, *pp.* 29, 341)—The following drugs are recommended: **Opium** and **Belladonna Suppositories, Monobromate of Camphor,** 6 gr. three or four times daily, **Eubornyl,** or a mixture of **Bromide of Potassium, Lupulin,** and **Camphor.**

CHOREA. *Prof. G. F. Still, M.D.*

Chorea, as Allan[1] points out, is a disease of very variable intensity: it may be so severe that the child is almost, if not quite, maniacal; it may be so slight as to be only just perceptible. It is to these latter cases that Miller[2] gives the name "latent chorea." He divides the symptoms of chorea into motor, mental, and atonic, and points out that all these are to be found in very slight degree in some rheumatic children, so that a very little fidgetiness or clumsiness, an undue excitability or irritability, or perhaps sleeplessness or headaches, may be the only evidence of chorea, and the rheumatic taint may be detected only on careful enquiry for "growing-pains" or sore throats. He suggests that possibly these slighter cases of chorea may be due to a rheumatic toxæmia, while the more fully developed cases may mean a rheumatic infection of the central nervous system. Miller sums up his observations thus: Chorea declares itself first by symptoms of general nervous instability; the possibility that slight nervous disorders of various kinds in children may have originated from a slight rheumatic infection is worth remembering; the association between rheumatism and nervous instability is not due to any special liability of neurotic children to rheumatic infection; the nervousness is rather the result of the infection; mental depression and headaches in rheumatic children are usually to be attributed to the disease and not to salicylates; the association of the very slight nervous symptoms which are included under the term "latent chorea" with definite acute rheumatism, affords evidence that the ordinary more pronounced chorea is also rheumatic.

Prognosis.—As everyone knows, chorea as a rule subsides after several weeks; but what becomes of the choreic patient subsequently

is not so well known. Forssner[3] followed up 28 cases which had been treated at the Stockholm University from 1885 to 1892. He found that 7 had died subsequently of heart disease ; 7 had more or less severe cardiac affection ; 5 had developed phthisis ; in 7 there was albuminuria with heart affection, and one of these had a goitre ; 1 had a goitre with some cardiac trouble, probably Basedow's disease ; 1 had some gastric disorder ; 1 had become mentally affected. Only one out of the 28 cases appeared to be in normal health ; 5 of the patients suffering from heart trouble had died before reaching eleven years of age, and of the remaining 23, at least 14 had developed some chronic affection which could not be accounted for as a complication of chorea. The author concludes that chorea attacks those of feeble constitution whose power of resistance to other diseases also is weak.

Treatment.—Allan (loc. cit.) emphasizes the need of **Rest in Bed,** and says this is necessary in all cases, whether acute or chronic. He points out that whilst an out-patient of a hospital attends with chorea for months without benefit, the same child admitted to the wards is relieved in ten days or a fortnight. There is only one circumstance which contraindicates rest in bed : great depression in a child with mild chorea because he is kept in bed ; this, Allan thinks, may aggravat the chorea, and therefore he would enforce only partial rest in bed during the day in such a case. In most cases rest in bed must be complete for three or four weeks.

Isolation is recommended by Allan in the more acute cases ; he quotes Bruel's scheme of rest and isolation according to the severity of the case : (1) Going to bed early and rising late, so as to spend fourteen hours in bed ; (2) Going to bed also for two hours in the middle of the day ; (3) Absolute rest in bed for a fortnight, with very little visiting by relatives ; (4) Darkening of the room, except at meal-times.

The value of the **Hot Pack** has been emphasized by Pasteur,[4] who considers that in severe cases this should be tried in preference to any other treatment. A **Warm Bath** is also recommended by Allan (loc. cit.) as inducing sleep and quieting the chorea. In the rare cases with hyperpyrexia a **Cold Pack** may be necessary. During convalescence a **Cold Spray** is useful, and **Massage** should be done, according to this author, every night and morning.

Arsenic, given first in doses of 3 to 5 min. of the liquor arsenicalis three times a day, and increased by 2 min. every second day until 11 to 20 min. were being taken thrice daily, seemed to do good, but this was less successful than **Acetyl-salicylic Acid** (aspirin), which Allan regards as the drug *par excellence* for chorea, and prescribes thus :—

℞ Acid. Acetyl-salicyl.	ʒiiss	Syr. Aurant.	ʒj
Gum. Acac.	q.s.	Aq. Chlorof.	ad ʒiv

A dessertspoonful to be given every four hours to a child aged six years.

The only untoward symptoms which he has observed from this drug have been excessive perspiration, and in one case tinnitus aurium.

He rightly quotes, however, a very important case recorded by Lees in which coma was produced by aspirin. He considers that this drug is less likely to depress the heart than is salicylate of sodium, and that gastric symptoms from it may be avoided by giving the aspirin after meals only, and never on an empty stomach.

Trional has been advocated, and the following formula is suggested :

℞	Trional	gr. xv	Gum. Arab.	gr. iij
	Pulv. Sacch. Alb.	ʒij	Aq. Flor. Aurant.	ʒiiss
	Gum. Trag.	gr. iij	Aq. Lauras. Ceras.	ʒss

Fiat emulsio. One-third part to be taken in milk or water at each dose.

Five grains of trional have been given three times a day to children with chorea. **Strychnine** is recommended especially in cases where there is muscular wasting or paresis.

Camphor Monobromate was used by Ghetti[5] in doses of ¾ gr. in cachet, three times a day for one week, and then four times a day for another week, for children with chorea, aged nine and seven years respectively ; recovery was thought to be more rapid under this treatment than with arsenic.

Riva,[6] holding that chorea is bacterial in origin, tried intravenous injection of **Corrosive Sublimate,** giving $\frac{1}{20}$ to $\frac{1}{6}$ gr., which doses were found to be well tolerated by children.

Very large doses of arsenic have been used in the treatment of chorea by many physicians. Hassin and Hershfield[7] describe cases treated, as Comby suggested, with large doses of **Arsenious Acid.** A solution of this drug 1–1000 is used ; at first ½ dr. in divided doses is given in water during the day ; next day the dose is increased by 1 dr., and so on for three or four days. The authors state that arsenious acid is less likely to induce troublesome toxic symptoms than the preparations of arsenic commonly used ; this, however, is certainly not proved by the few examples they mention, in which two out of four suffered from toxic effects.

For the use of **Arsentriferrin,** see *page* 18.

Sabromin is one of the latest preparations of bromide which have been used for chorea. According to Maetzke,[8] it is free from taste and smell, and is much less likely to produce the toxic effects of bromism than the ordinary bromide salts. Sabromin is a combination of bromine with calcium ; it is prescribed in tablet form, six tablets (containing in all about 45 gr.) may be given daily to a young adult, but half this dose may be sufficient.

References.—[1]*Amer. Jour. Med. Sci.* Feb. 1910 ; [2]*Lancet,* Dec. 18, 1909 ; [3]*Hosp.* July 2, 1910 ; [4]*Med. Rev.* July, 1910 ; [5]*Gaz. deg. Osped.* Mar. 10, 1910 ; [6]*Sem. Méd.* May 11, 1910, in *Prescriber,* July, 1910 ; [7]*Med. Rec.* July 2, 1910 ; [8]*Deut. med. Woch.* July 28, 1910.

CICATRICES.

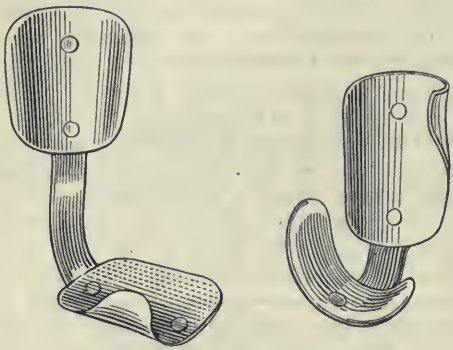
Radium in (*page* 83)

CLUB-FOOT. *Priestley Leech, M.D., F.R.C.S.*

At the 1909 meeting of the British Medical Association, in the Section of Diseases of Children there was a discussion on this subject. Jones,[1] of Liverpool, in opening, limited his observations to the congenital form of equino-varus. The primary distortion in this form of club-foot is a dislocation inwards of the anterior part of the foot at the mediotarsal joint. In addition to the usual elements of distortion of the tarsal bones, in a large proportion of cases there is an inward rotation of the tibia and fibula, so that the external malleolus presents in front of the tibia, and this deformity is a very important one in the treatment of the condition. He believes that with appropriate early treatment grave operative procedures would never be needed. Cases are constantly met with where it is expedient to attack bone, but such cases involve neglect by the parents or insufficient treatment on the part of the practitioner. If one has been given a free hand in the treatment of an early talipes, there is no excuse for failure, and the so-called relapsed or intractable case should never result. Treatment should be begun at once: a baby a day old is an infinitely easier problem than one a month old; and very often the treatment of a child at three months may require very skilled and forcible effort. Jones emphasizes this point all the more, as there are authors even yet who mischievously write of six weeks and ten months as a suitable age to begin treatment. He has never yet seen a case of club-foot in which treatment has been started in the first week where the deformity could not be rectified in two months by manipulation and retention.

In a simple case the tibia and fibula should be grasped at the epiphysis, and the foot should be alternately everted and flexed. In all manipulations for club-foot, the epiphysis should be grasped tightly to avoid strain. Following eversion and flexion, the heel should be grasped in one hand and the anterior portion of the foot in the other, and abduction practised at the mid-tarsal joint. Five minutes spent three times a day in doing this should be followed by gentle massage of the flexors and peronei. Then comes the application of a bandage or of a rectangular splint. Few seem to appreciate how much can be done by the application of a bandage. To invert a foot, the bandage should be started on the outside; to evert, on the inside. In cases of equino-varus it should start on the inner side of the ankle, pass under the sole of the foot, over the front of the ankle, and so evert it. Every turn of the bandage so applied pulls the foot outwards. Care should be taken, if a bandage be used with or without a splint, not to carry it much above the ankle, lest the muscles be thereby weakened. In those simple cases where frequent manipulation is employed without retention, an intelligent nurse can easily be taught to lighten the labours of the surgeon. If the surgeon is able to restore the foot to above a right-angle, division of the tendo Achillis will not be needed; otherwise it is better to divide it. He believes in correcting the varus and dividing the tendo

Achillis at the same sitting, as the tendon becomes a powerful inverter of the foot. In certain cases, the displacement caused by the tendo Achillis has been so great that Jones has divided the tendon longitudinally and separated one half of its insertion, passing it under the outer half of the tendon, and affixing it to the outer half of the heel. Immediate flexion should take place, as there is no fear of the tendon not uniting. At this time it should be noted if there is rotation inwards of the tibia and fibula; if this is present, treatment to remedy it should be commenced at once. The malleoli should be grasped in one hand and the leg held below the knee with the other; the lower hand rotates outwards and the upper inwards. If this is done daily, by the time the foot is straight the rotation of the leg will also have disappeared.



Figs. 8 and 9.—Club-foot shoe.

Where cases are seen for the first time when three or four months old, other operative procedures may be needed in the form of subcutaneous division of any tightened soft structures; these may include the plantar fascia, the two tibial tendons, and any deep plantar ligaments. In severe cases, he supplements manipulation by

Fig. 10.—Retention splint.

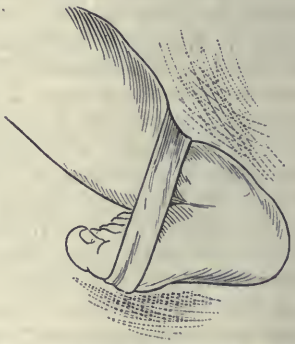


Fig. 11.—A simple way of retaining foot in overcorrected position.

Thomas's wrench. He uses a splint (*Figs.* 8 and 9), and to apply it a piece of plaster (*Fig.* 10) is started on the dorsum of the foot to evert the foot; the assistant pulls on this at right angles to the extended leg until the retention splint is placed in position. He prefers this

method to plaster-of-Paris, though in hospital cases the use of the latter is inevitable. No case of club-foot is cured until the patient can voluntarily raise his own foot from the deformed to the corrected position. During the whole course of treatment, **Massage** of the flexors of the ankle and of the peronei, together with **Resistance Exercises,** should be practised. Relapse is due to inefficient correction, to lengthened extensor tendons, and to erroneous deflection of body weight during walking. For the latter he uses a simple apparatus consisting of an iron bar which skirts the outer side of the sole; and the foot, aided by this and an inside iron to which it is bandaged, keeps everted during walking. In adults, bone operations are often needed, but it is essential that preliminary tenotomies, followed by thorough stretching, should be done.

In the discussion which followed, various views were expressed, some deferring division of the tendo Achillis to a later stage, and others recommending removal of the astragalus.

REFERENCE.—[1]*Brit. Med. Jour.* Oct. 9, 1909, p. 1065.

COCCYGODYNIA.

(*Vol.* 1910, *p.* 230)—Fracture of the coccyx (by direct violence, by parturition, or by powerful muscular action) can be detected by rectal examination, and treated by excision of the coccyx. A similar examination may discover some anal or rectal lesion to account for the pain. Gouty affections of the sacro-coccygeal joint sometimes occur and indicate treatment for gout. If the pain be a pure neurosis it may be relieved by a suppository of **Belladonna** gr. ½, with **Morphia** gr. ¼; while in obstinate cases the application of the **Paquelin Cautery** may be needful.

COLITIS, MUCOMEMBRANOUS.[1] *Robt. Hutchison, M.D.*

TREATMENT.—Patients who are, or have been, liable to attacks of mucomembranous colitis, should be treated with the object of removing the two underlying factors—the abnormal condition of the nervous system, and the constipation. The patient should be encouraged to think as little as possible about his illness, and be forbidden to make minute daily examinations of his excreta. He should avoid overwork and excitement, but his mind should be kept well occupied. A sufficient amount of exercise in the open air should be taken every day; but it is of the greatest importance to avoid undue fatigue. He should go to bed early, and in some cases it may be advisable to have breakfast in bed and only get up in the middle of the morning; but it is generally unwise for the patient to be kept completely at rest, a Weir-Mitchell treatment being definitely contraindicated. Removal from the home surroundings to a hospital or to some health resort is often very useful.

The constipation requires treatment by diet, massage, drugs, and enemata. In the majority of cases the best results are obtained with a **Generous Mixed Diet,** containing porridge, green vegetables, fruit, and whole-meal bread, together with plenty of butter and cream; but irritation by skins and pips of fruit should be avoided, and in severer cases, green vegetables should be passed through a sieve and prepared with butter. The food should be very well chewed, and all spices,

mustard, pepper, and game should be prohibited, as they tend to increase the colitis. The thin and anæmic patient who has often unwisely restricted his diet, should be encouraged to eat, even if anorexia be present; improvement in the appetite frequently occurs as soon as the weight begins to increase. A feeling of discomfort and fullness in the abdomen may occur at first, but it generally disappears within a few days of the change of diet. Sour milk is not specially indicated, as the colitis is secondary to constipation, and not due to an infection.

At the commencement of treatment every trace of fæces accumulated in the colon must be removed. This can best be done by the combined use of **Castor Oil** and **High Enemata**; in severe cases, injections of six to ten ounces of olive oil at night should also be given. Once the colon is empty, care must be taken to prevent the reaccumulation of fæces. In very mild cases, a change in diet and the administration of belladonna are all that is required, but an aperient is generally needed at first in order to obtain a daily evacuation. The most effective is castor oil, taken regularly the last thing at night or on waking in the morning. The dose must be regulated until one satisfactory stool is passed daily. As a rule, between half an ounce and an ounce is required. When castor oil cannot be taken, a saline purgative should be used. The purgative is always most effective when combined with an antispasmodic, such as belladonna or codeine.

Mild cases can be completely relieved by general treatment, diet, and drugs; but most severe cases require local treatment in addition. This can be done at home, but it is generally more effective when given at one of the spas in which there are special facilities for **Intestinal Lavage.** Until recently, Plombières and Châtel-Guyon stood alone in this connection, but since 1905 the same treatment has been very efficiently carried out in Harrogate. Between one and two pints of the water at a temperature of 100° F. are introduced into the colon through a long indiarubber tube, from a douche-can suspended at a height of one or two feet above the couch on which the patient lies. It is retained for ten or fifteen minutes, after which the patient gets up and evacuates the water, which is generally accompanied by some scybala and mucus. The proceeding is then repeated; a smaller quantity of fæces, but more membranes than after the first injection, are generally expelled. The irrigation is followed by a bath at 100° F., and a douche at 110° F. is played through the cooler water of the bath on to the abdomen with a finely perforated nozzle. The treatment is continued daily for about three weeks.

There is probably no specific action in either the simple thermal water of Plombières or the alkaline sulphur-water of Harrogate, the mechanical removal of fæces and mucus, and the sedative action of the hot douche being the cause of the success of the treatment. Normal saline solution should be used if the treatment is given at home, and injections of soap and water, antiseptics, or astringents should be avoided, as they tend to aggravate the condition by irritating the

mucous membrane. When the result is not satisfactory, olive oil may be injected in the evening and retained during the night before the high enema of water is given. Roger has found that bile contains an anti-mucinase which prevents the coagulation of mucin by mucinase; for this reason, ox-gall may be added to the oil. The effect of the intestinal douches is much increased if the bowels are opened, naturally or with the aid of a mild aperient, shortly before they are given.

Various operations have been performed for intractable cases of mucomembranous colitis. In the very exceptional cases in which all other treatment has failed, an **Appendicostomy** (*vide Medical Annual*, 1910) should be made, so that the colon can be thoroughly flushed with water through the opening into the appendix, and so kept empty. But the result has been unsatisfactory in many cases; and with the closure of the opening into the appendix there is a considerable probability of a recurrence, as the underlying nervous condition is unaffected.

During a severe attack, the patient should remain in bed. The pain can generally be relieved by means of hot applications to the abdomen. **Codeine** and **Belladonna** are the most useful drugs, and in very severe cases an opium suppository may have to be administered.

REFERENCE.—[1]Hertz, *Clin. Jour.* Aug. 3, 1910.

COLON BACILLUS.

Value of **Vaccine** Treatment (*page* 57).

COLON, IDIOPATHIC DILATATION OF (Hirschsprung's Disease).

Robt. Hutchison, M.D.

Full accounts of the above condition were published last year by Hey Groves[1] and by Wilkie.[2] The paper of the former writer contains an extensive bibliography and an account of the history of our knowledge of the disease.

MORBID ANATOMY.—The whole colon alone may be distended, or more frequently only special sections are affected, the pelvic colon having the most marked tendency in this direction. In 93 cases where this point is specially mentioned, the distribution of the dilatation is as follows: Pelvic (or sigmoid) flexure alone, 31; several sections of the colon, the pelvic often being one, 39; the whole colon, 13; colon and rectum, 6; colon and part of the small intestine, 4. The degree of dilatation varies within very wide limits in different cases, and in the same case at different times. When the abdomen is opened, the distended viscus is often described as resembling the stomach, or as being as thick as a man's thigh. It is frequently 18 cms. in diameter, and between 50 and 60 cms. in circumference in adult cases; in infants it may reach 35 cms. round. In several cases the size of the distended coils varied very much under different conditions.

In most cases, the length of the colon is increased as well as its diameter, but this is not invariable. The enlarged, and often lengthened, coils of colon become necessarily kinked and twisted in order to accommodate themselves to the cavity of the abdomen.

This is most notably the case with the transverse and pelvic portions. The former is dragged down by the weight of its contents, forming a long dependent loop hanging into the pelvis. The latter assumes the horse-shoe or ∩-shape which is so characteristic of volvulus, and indeed, as is mentioned later, it is not infrequently the preliminary stage of sigmoid volvulus. The normal flexures become exaggerated, the first part of the transverse colon with the hepatic flexure presenting a complicated folding like the letter W, and the two limbs of the splenic flexure lying in contact with each other for several inches. In nearly all cases involving the pelvic colon, there is a well-marked sharp kink at the beginning of the rectum.

The outward appearance of the bowel is normal as a rule, but white or œdematous patches occur on its surface sometimes. In children the lymph-glands are often increased in size and number. The wall of the colon is usually thickened (6 millimetres), and this hypertrophy, whilst affecting chiefly the circular muscle layer, also involves the mucous membrane and submucous tissues. The tænia are present as broad bands 3 or 4 cms. wide, and in some cases the longitudinal fibres exist as a continuous coat round the bowel. This thickening of the muscular coats is rightly insisted on by many authors as a clear evidence of the effort made by the bowel to empty itself of its contents, and is comparable to the hypertrophy of hollow muscular viscera, e.g., the heart or bladder, which often accompanies dilatation.

According to the majority of authors, inflammatory changes are comparatively rare, at any rate in their grosser forms of external adhesions or internal ulceration. The mucous membrane is often infiltrated by leucocytes, and its connective tissue much increased. Ulceration secondary to fæcal impaction is sometimes found, and is to be inferred in those cases where much blood-stained diarrhœa occurs.

Physical Signs.—These consist in abdominal distention, often accompanied by wasting of the rest of the body, with visible colon loops and peristalsis. The most usual disposition of these loops of colon is in a vertical direction. The distended pelvic colon lies usually as a large ∩, the apex of which may touch the costal margin. When the ascending and transverse colon form visible loops, they too are disposed in the long axis of the abdomen. Next to the pelvic colon, the ascending colon seems most frequently to form a visible coil, and the descending colon is most rarely thus affected. From time to time the distended coils can be observed slowly to contract, and a sluggish peristaltic wave is often accompanied by audible borborygmi. On rectal examination, very different conditions may be found. In a few cases the sphincter ani has been found tightly contracted; but that this is not an essential feature of the case is shown by the majority not presenting it, and further, by cases in which it is patulous or paralyzed. A painful fissure in ano is a common result of the excoriation produced by the passage of hardened fæces.

Symptoms.—The most prominent are obstinate constipation, loss of appetite, and emaciation. The constipation is profound, the bowels

often failing to respond to even the most powerful aperients. It is common for attacks of diarrhœa to alternate with the constipation. Emaciation very soon becomes pronounced in children, and is partly caused by the loss of appetite. In adults, it is of great importance, because it indicates that the metabolism is being seriously disturbed. In this respect it would afford a valuable indication as to the necessity of treatment. As long as a case of constipation, however severe, remains well nourished, it will probably yield to drugs, enemata, and diet; but when progressive emaciation sets in, the patient has not long to live, unless some radical treatment is adopted. And with the faulty nutrition there is generally some affection of the nervous system. In infants, drowsiness and convulsions are common, and the latter may be the cause of death. In one case, the child suffered from severe tetany. With older children, the mental development may be greatly impaired, and in adults various degrees of neurasthenia or melancholia are very common. If persistent diarrhœa takes the place of constipation, the temperature rises, and symptoms of peritonitis set in, with vomiting and convulsions, indicating the occurrence of a perforation. But with the exception of this possibility, vomiting is quite unusual, and is never stercoraceous. In young children, various lung complications, such as bronchitis or bronchopneumonia, are common causes of death, owing, no doubt, to the great pressure on the thoracic viscera.

The severity of the symptoms varies greatly in different cases, and in the same cases from time to time. The condition is sometimes even entirely latent. The majority of cases first present themselves for treatment before the age of ten, but the symptoms may arise in early infancy. Nearly all the adult cases occur after the age of forty. The sex incidence shows a very marked preponderance of males, and this is more marked in the infant than in the adult cases. The figures given by different authors indicate varying proportions, but all agree in the above statement. In 122 cases, 94 were males and 28 females (3·35 : 1). In infancy, the proportion of males to females is 7 or 10 : 1; whilst in adult life it is 2 or 3 : 1.

Etiology.—The cause of the dilatation still remains very obscure. The subject cannot be fully discussed here, but the following theories have been advanced (Wilkie) :—

1. "The dilatation and hypertrophy are truly congenital." This view is strongly held by Hirschsprung himself. Mya called the disease "megacolon congenito." Concetti calls it "megalocolie." Kredel describes it as "eine Art Riesenwuchs des Colon." Generisch, Griffith, Sternimann and Neugebauer all support this view.

2. That abnormal length and sling formation of the pelvic colon, with or without secondary kinking, volvulus or valve formation, is responsible for the condition. This view has very numerous supporters, among whom may be mentioned—Jacobi, Broadbent, Morgan, Duhamel, Johanessen, Neter, Frommer, W. Bergmann, Baginski, Mulberger, Bittorf, Delkerkamp. This may be called the "anatomical theory."

3. That an abnormally long pelvic mesocolon with secondary twisting of the pelvic colon is the cause. This view has not obtained much support, but is brought forward by Borth, Gourévitch, and Schuckmann.

4. That there is congenital aplasia of the muscular coat of the intestine, with secondary distention. This is the "ektacolie" of Concetti; Berghniz supports this view.

5. That there is a weak tonus of the muscular coat of the colon, the result of defective innervation. "Neuropathic dilatation and hypertrophy," Hawkins calls it. Bing is a strong supporter of this view, and Lunn, Fitz, and Lennander also favour it.

6. That spastic contraction of the lower part of the colon, or of the sphincter ani, cause dilatation and hypertrophy above. Fenwick, See, Hitchin, Drew, and Schreiber bring forward evidence to support this view. Wilms believes "functional spasm of the sphincter ani" to be the cause.

7. That it may be caused by a primary inflammatory alteration in the wall of the colon. Griffiths is the only advocate of this view.

8. That there is congenital narrowing of the rectum or the lower part of the pelvic colon. Treves first advanced this view. Hobbs and de Richmond and Gruneberg support it in a slightly modified form.

9. That in some cases, inco-ordinated muscular action of the colon, similar to that present in congenital pyloric stenosis, may be the cause (J. Thomson).

TREATMENT. — Whilst it is evident that, in its extreme form, "idiopathic" dilatation of the colon is one which requires surgical treatment, and that in its slight grades medical and dietetic measures will suffice, there must always remain an intermediate group of cases in which there is a difference of opinion as to what should be done.

Diet.—Dealing first with the slighter stages of the disease, most authors advise easily digested diet which leaves comparatively little residue—such being, of course, milk, fish, eggs, and white bread. But it is possible that in some cases the colon will react better when stimulated by bulky food residue, such as that left by brown bread, porridge, and vegetables; and Concetti advocates such a diet as being the most satisfactory. There must, however, be some difficulty in determining if the colon is really emptying itself when fed with the coarse food. The motions may be bulky and even regular; but, on the other hand, there will probably be a larger residue left in the colon. This point could be decided only by mixing bismuth with the food and noting the condition of the colon by radiography.

Drugs.—In almost all cases these are useless, and they are worse than useless when great distention exists. Saline aperients, calomel, castor oil, and even croton oil cause some griping, but no evacuation of the bowels. Probably stimulating drugs such as **Strychnine, Iron,** and **Aloes** will be more beneficial; and Grey relates in one case how, after clearing out the colon by enemata, he was able by means of aloes and iron pills to restore the tone of the bowel.

Enemata.—Here, again, the use of rectal injections can only succeed if the bowel is capable of responding to the direct stimulation of distention, heat, or chemical agents, and if the injections can be thrown into the affected parts of the colon. Further, if an irregular spasm exists, as has been described in some cases, this spasm may be intensified by injections. Therefore it is that enemata have only a limited usefulness. Probably some form of oil injection is the most valuable, because it is much more slowly absorbed, and because it will soften the hard fæcal masses. In one of Groves' cases, a pint of **Olive Oil** was injected by a long tube at night, and the next morning an enema of hot soap and water with one ounce of turpentine was administered. By this means a daily evacuation was procured when all other means had failed.

Other Tonic Measures.—When diet, drugs, and enemata seem likely to give relief, the use of **Massage** and **Electricity** will be of use in aiding the recovery. In theory it would seem that an electric stimulus was the most ideal treatment; but in practice its value seems to be little more than that here indicated, i.e., an adjuvant to other measures. This may be due to the physiological facts relating to the co-ordination of muscular contractions and nerve impulses. An electric stimulus may start a colic contraction; but this may increase an already existing spasm, or may excite the antiperistaltic wave more than the peristaltic contractions. Conditions which cause or favour enteroptosis should be avoided; these are the use of corsets and the usual attitude of defæcation. For these should be substituted an elastic abdominal belt and defæcation in a squatting position into a utensil on the ground. Physical exercise should be taken with the special view of strengthening the abdominal muscles.

Surgical Treatment—In cases of true idiopathic dilatation of the colon, there can be no doubt that surgical treatment is demanded, and should be performed with the least possible delay. If all the means indicated above have proved inefficacious, operation should be advised before the patient's general nutrition has suffered by emaciation and toxæmia. In cases where the diagnosis is doubtful, and obstinate constipation is the most prominent feature, the indications for operative interference would seem to be as follows: A long history of constipation, dating back to childhood, and indicating probably a congenital defect in the colon; failure of diet, drugs, and enemata to afford permanent relief; marked and increasing distention of the abdomen; visible peristaltic contractions; progressive loss of flesh.

In comparing the results given by medical and surgical treatment respectively, Löwenstein gives the following figures relating to 103 cases:—

Result	Medical (59 cases)	Surgical (45 cases)
Died ..	39 cases (60 per cent)..	21 cases* (48 per cent)
Unaltered	4 ,, ..	2 ,,
Improved	9 ,, ..	7 ,,
Cured ..	7 ,, (12 per cent) ..	15 ,, (34 per cent)

* Three had perforation at time of operation.

Duval[3] gives the results of treatment in 94 undoubted cases collected by Danzinger as follows :—

Result	Medical Treatment (59 cases)	Surgical Treatment (35 cases)
Deaths ..	74·68 per cent ..	34·2 per cent
Cured ..	13·5 ,, ..	60·0 ,,
Improved ..	7 ,, ..	5·8 ,,

The operations available are resection, entero-anastomosis, coloplication, colopexy, and colostomy. The relative advantages of these cannot be fully considered in this article, but the nature of the operation to be preferred must always depend to a large extent on the exact condition of the colon in the particular case. Resection, however, is the operation of choice.

REFERENCES.—[1]*Lancet,* Dec. 11, 1909; [2]*Edin. Med. Jour.* Sept. 1909; [3]*Rev. de Chir.* Sept. 10, 1909.

CONJUNCTIVA, DISEASES OF.

John H. Yearsley, M.A., M.R.C.P., F.R.C.S.

Ophthalmia Neonatorum.—Of those cases—about 15 per cent—in which no pathological organism is found, most are, in Sydney Stephenson's[1] opinion, due to congenital syphilis. He points out that a chronic gonorrhœa in the mother may cause her no discomfort, and she may even be unaware that she is infected; if the attendants, therefore, suspecting no danger, take few or no precautions, they may be faced in a few days by a frank gonococcal ophthalmia.

The prophylactics favoured by Stephenson are, 1 per cent **Silver Nitrate,** 25 per cent **Argyrol,** and 10 or 15 per cent **Protargol.** He deprecates the too common practice of relegating to the midwife a duty which should be performed, or at least supervised, by a medical man.

In Germany **Blennolenicetsalbe*** is much used for the treatment of infantile ophthalmia. Every two hours the lids are opened, the secretion is wiped away, and a piece of the ointment is placed inside the lower sulcus.[2] The treatment has disappointed Bayer, while Kümmell,[3] of Erlangen, after employing it in several cases for one eye, and simultaneously using silver nitrate for the other, declares in favour of the latter. The disastrous case recorded by Spiro,[4] of Rostock, appears to have been the only one in the eye clinic submitted to the blennolenicet form of treatment. The experience naturally, if illogically, serves to discredit the ointment, especially as the results obtained at the clinic with 10 per cent protargol are excellent.

* The ointment contains 10 per cent of lenicet—a basic aluminium acetate—mixed with white vaseline, ceresin, and lanolin.

Of the several organic preparations of silver used in the treatment and prevention of ophthalmia neonatorum, none has a greater vogue than argyrol. Its popularity is in no small measure due to Darier, of Paris, who has so frequently pointed out its value. As a prophylactic when maternal gonorrhœa is suspected, Darier[5] advises that 5 or 6 drops of a 10 or 15 per cent solution be dropped between the baby's opened lids and brushed along the lid margins. The caustic action of silver nitrate predisposes, according to Darier, to secondary infection. If ophthalmia is present, 20 per cent argyrol may be dropped inside the lids many times in the twenty-four hours, and the nitrate should be reserved for those cases which fail to yield to less caustic agents.

Van Lint,[6] while preferring argyrol as a prophylactic, gives pride of place to silver nitrate in the treatment of the disease. He, however, regards the organic salt as a valuable adjuvant which can be frequently instilled, and which, so far from causing pain, is even soothing to the inflamed eye. He calls attention to the importance of properly preparing the argyrol solution. The powder without previous trituration is dropped into *cold* water and left to dissolve. A drop of a good preparation, when allowed to run on a glass surface, leaves in its wake a stain the colour of tincture of iodine ; if the preparation is bad, the track is watery, and contains small grains, which would obviously cause pain if placed inside the eyelid.

Trachoma.—In the acute stage Jocqs[7] recommends the free use of 5 per cent protargol, and, when the discharge is reduced, scarification and **Brossage** of the granulations. After allowing the reaction to subside, finger **Massage** of the everted lids and fornices with a mixture of calomel and powdered sugar may be performed twice a week. All treatment of the conjunctiva beyond the instillation of protargol is of course carried out under local anæsthesia. In the chronic stage Jocqs extols the occasional use of **Ginestou's Crayon,** which, after cocaine has been dropped into the conjunctival sac, causes much less pain than the dreaded " bluestone." The formula for the pencil is :—

Sulphate of Copper ..	gram	1·0
Orthoform	,,	·5
Holocain Hydrochloride	,,	·4
Gum Tragacanth	,,	·1
Water		q.s.

To make a crayon 5 cms. long.

For those who prefer the sulphate in its orthodox form, the substitution of 1 per cent oily solution of **Acoin** for cocaine offers some advantages, for as Farnarier,[8] of Marseilles, reminds us, acoin has no desiccating action upon the cornea, and affects neither the dilator pupillæ nor the ciliary muscle, while its anæsthetic power is as great as that of cocaine. As, however, the oil prevents intimate contact of the caustic with the mucous surface, Farnarier applies the " bluestone " first, and immediately afterwards instils the acoin.

Hegner and Baumm,[9] of Breslau, have been treating fresh trachomatous granulations by means of the **Quartz Light** (*Fig.* 12). The lamp is armed with a quartz rod, the distal end of which, 5 mm. in diameter, is applied to the affected area. The precautions which Lundsgaard pointed out as necessary when using the Finsen light are superfluous in the case of the Quartz lamp, injury to the retina or a too wide irradiation being almost impossible. The rod may either be steadily applied at one spot, or "ironing" movements (*plätteverfahren*) may be made with it over a small field. An exposure of each area for from five to ten minutes produced in twenty-four hours a "false" membrane such as is seen in croupous conjunctivitis. By the fourth day the membrane had been shed and the surface left was smooth and

Fig. 12.—The Quartz-lamp Treatment of Trachoma.

free of granulations. As the whole of the granular surface could not be dealt with at one *séance*, the light treatment was repeated, and in some cases a third exposure was necessary.

The *Körperchen* or "bodies" first described by Halberstädter and v. Prowazek, and declared by them to be the cause of trachoma (see last year's *Medical Annual*), have attracted much attention, and their presence in at least acute and untreated cases of the disease has been reported by many observers, who have at the same time failed to detect them in other conjunctival inflammations. Grüter,[10] for example, who investigated a series which included follicular catarrh, spring catarrh, and conjunctivitis of various types, did not see any "bodies."

The first to find them on the non-trachomatous conjunctiva was Stargardt, who met with them in a case of non-gonococcal ophthalmia in an infant. Next Heymann, at the Budapest Congress, in September,

1909, announced their association with gonococci in the discharge from a baby's eyes, and even Halberstädter and v. Prowazek[10] were forced after further investigation to admit that "bodies" indistinguishable from those of trachoma may be present in non-gonococcal ophthalmia of the new-born. Similar non-bacterial (or *einschluss*) cases were observed by Schmeichler and by Lindner, the latter of whom also reported, as Heymann had, a "mixed" conjunctivitis. Finally, Addario claimed to have seen the *Körnchen* in diplococcal conjunctivitis and even on the normal conjunctiva.

Since his first communication, Heymann[11] has turned his attention to the genital discharges of the parents of infants suffering from ophthalmia, and has found that the gonococcus may be accompanied by körnchen. After investigation of the same kind, Halberstädter and v. Prowazek have announced that the genital secretion may contain "bodies," but not in association with gonococci. The result of his experimental inoculations of monkeys (which are immune to gonorrhœa) with the einschluss, leads Heymann to conclude that the "Prowazek bodies" from the non-trachomatous conjunctiva and in genital secretion are not a reaction product of the gonococcus, but are due to a virus hitherto undescribed.

An example of uniocular trachoma of several years' standing is reported by Benson.[12] No theory seems capable of accounting for the immunity of the sound eye.

Ophthalmia Nodosa.—Marlow,[13] of Syracuse, N.Y., describes a case of this rare affection (*Fig.* 13). A boy of six had a white caterpillar thrown into his eye. There was some pain for a short time. Marlow saw him three months after, and found between the cornea and the inner canthus two groups of nodules surrounded by a faint inflammatory ring. The nodules were shaved off under ether anæsthesia, and their "beds" touched with the electro-cautery. On microscopical examination the nodules were seen to contain caterpillar hairs embedded in granulation tissue.

Salvagemen's Ophthalmia.—Trantas,[14] of Constantinople, applies this name to an affection of the eyes in several members of the crew of a salvage ship who were exposed to an atmosphere charged with sulphuretted hydrogen while they were engaged on a wreck with a cargo of waterlogged grain. There was intense irritation of the eyes, photophobia, and lacrymation, with hyperæmia of the limbus conjunctivæ. The cornea appeared to the naked eye unaffected, but oblique illumination showed fine diffuse grey spots, while staining with fluoresceine brought out a green band opposite the pupil. The eyes recovered in two days, the only treatment employed being boracic lotion and cocaine.

Nodular Leprosy affecting the Eye.—Treacher Collins'[15] case had hard nodules on the face, trunk, and extremities. The right eye (see *Plate XXV, Fig. A*) had two large yellowish swellings above and below the cornea and encroaching upon it, leaving only a narrow semi-opaque strip. The left eye had a large swelling below the cornea and passing

into it. Acid-fast bacilli were found on microscopically examining a smear from an ulcerated nodule on the leg.

Episcleral Tubercle.—An instance of this somewhat uncommon condition is described by Lawford.[16] The patient—a boy—had a small, hard, subconjunctival nodule on the right eye (see *Plate XXV, Fig. B*). The swelling, which was neither painful nor tender, was removed and its "bed" scraped. Inoculation of a guinea-pig and microscopical examination confirmed the diagnosis of tubercle.

Idiosyncrasies of Eye to Cocaine and Atropine.—Cauvin[17] records the somewhat alarming sequel to the instillation of a few drops of cocaine

Fig. 13.—Dr Marlow's Case of Ophthalmia Nodosa

into the eye of a mechanic preparatory to the extraction of a foreign body. Next day there were œdema of the lids and malar and frontal regions and chemosis of the conjunctiva. The patient had an uncomfortable feeling of tension in the swollen parts. Small blisters appeared four days later. The phenomena then began to subside, and the parts were normal in eight days. The patient had suffered in the same way on several previous occasions after a foreign body had been removed from the eye under cocaine anæsthesia. Recently, when the man came for another extraction, Cauvin substituted stovaine (2 per cent) for cocaine, and it was not followed by any ill effect.

In another of Cauvin's patients two drops of a 1 per cent solution

PLATE XXV.

NODULAR LEPROSY AFFECTING THE EYE

(Treacher Collins' Case.)

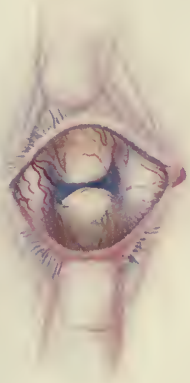


Fig. A.

EPISCLERAL TUBERCLE.

(J. B. Lawford's Case.)

Fig. B.

By kind permission of the Ophthalmological Society

of atropine in one eye caused chemosis, œdema, eczema and itching, lasting for four days. Later, the same effect followed the instillation of the mydriatic into the other conjunctival sac. While this idiosyncrasy to cocaine is rare, every ophthalmic surgeon must have seen cases presenting those irritative phenomena connoted by the term "atropine conjunctivitis." Cauvin suggests that the reaction, whether to atropine or cocaine, has a rheumatic basis.

Xerosis of Conjunctiva with Night Blindness.—Hepburn's[18] view that certain rays of light inhibit the mucous glands of the conjunctiva and retard the metabolism of the visual purple seems plausible. The theory receives support from the good effect produced by bandaging the eyes during the day and thus excluding any harmful rays. In a few weeks the night-blindness is often cured and the keratinized patches at the limbus corneæ are gone.

The Conjunctivitis of Measles is, in Van Lint's[19] opinion, best treated by instillation of a drop of 10 per cent argyrol into each eye twice daily throughout the course of the disease. Corneal complications are more likely to be warded off in this way than by using boracic lotion.

References.—[1]*Hosp*, Mar. 12, 1910; [2]*Münch. med. Woch.* Aug 24, 1909; [3]*Ibid.* July 12, 1910; [4]*Ibid.* Aug. 24, 1909; [5]*La Clin. Oph.* Sept. 1910; [6]*Ibid.*; [7]*Ibid.* Mar. 1910; [8]*Ibid.* Ap. 1910; [9]*Berl. klin. Woch.* July 18, 1910; [10]*Münch. med. Woch.* Sept. 21, 1909; [11]*Berl. klin. Woch.* Ap. 11, 1910; [12]*Dublin Med. Jour.* Jan. 1910; [13]*Arch. Oph.* Mar. 1910; [14]*La Clin. Oph.* May, 1910; [15]*Oph. Soc. Trans.* vol. xxix.; [16]*Ibid.* vol. xxx.; [17]*La Clin. Oph.* Feb. 1910; [18]*Oph. Soc. Trans.* vol. xxx.; [19]*La Clin. Oph.* Sept. 1910

CONSTIPATION. *Robt. Hutchison, M.D.*

A discussion on this subject was held at the meeting of the British Medical Association in London last year.[1] It was opened by Dr. Goodhart, who defined constipation as unnatural delay in the passage of the intestinal contents along the colon. The transit of the small intestine was usually rapid, and delay did not as a rule occur until the cæcum was reached. Replying to the question as to what constitutes delay, he referred to Dr. A. F. Hertz's observations on bismuth meals by means of the *x*-rays, which demonstrated that the passage of the intestinal contents along the colon only occupied some twenty hours after taking the meal; to this there must be added, for delay in the collecting-chamber, a variable time, probably in most people three to four hours, until the call for expulsion comes. Normally, in from thirty to forty hours after taking a meal by the mouth, it is completely evacuated. Constipation, therefore, falls into two groups—constipation of the colon, and of the collecting-chamber or rectum. The former is an automatic reflex outside the control of the will; the latter is largely aided by voluntary effort, and the trouble comes into being when voluntary effort fails. This form was mostly present in old people, in women of lax habit who had borne children, and in such as had habitually neglected to form good habits. Constipation of the colon was a more intricate and interesting subject, and was in the main a physiological one. Its causes were concerned

with the neuro-muscular apparatus of the intestinal wall, and with the intestinal contents. The nervous element was a preponderating one, and in this connection Dr. Goodhart referred to the influence of habit, of the temperament of the subject, and the mental state. Chronic constipation was in many people the result of neglectful irregularity. It was sometimes an evidence of increasing mental derangement of a severe kind. He then gave an interesting account of the physiology of peristalsis, and expressed doubts as to whether it had received its due meed of appreciation. He referred to its constancy, its strength, and its directness of purpose, and pointed out that though for the most part deliberate, it was increased after each meal. He discussed the mechanism of the production of scybala, and stated that they seldom caused intestinal obstruction. He did not attach much importance to kinks and adhesions in this connection, since peristalsis was adapted to overcome these conditions. In regard to the intestinal contents, he attached great importance to the quality, quantity, and variety of food. The absence of one of the usual meals on any one day might delay the action of the bowels on the next, and he affirmed that to ensure regular action of the bowels the colon must be full. He believed that the colon was a great feeder, and that abundant absorption went on in this organ. He deprecated the idea that the object of treatment should be to keep the colon empty, for he believed it to be an important organ of nutrition. He ridiculed some of the current ideas in regard to diet, and maintained that, in order to ensure regular action, adequate intake sufficient to keep the colon full was a necessity. He believed that much of the constipation in women of the upper classes was due to deficient intake of food, and that the constipation of old age was in part due to the necessarily limited diet. Another class was formed by those who ate enough, but imagined themselves constipated, and by taking pills actually created an artificial constipation. He also referred to the importance of the colon as an excretory organ, and strenuously combated the doctrine of intestinal auto-intoxication, which he described as unsound and baneful. In regard to the treatment of constipation, he was of opinion that not every case needed it. Many people who were habitually constipated were completely healthy when unharassed by aperients. He strongly attacked what he described as the obsession of the urgency of securing a daily stool, and also the ideas that blocks readily occurred and that the colon was to be regarded as a poison-bag. He looked upon the effects of treatment by intestinal antiseptics as very inconclusive. In regard to surgical operations, he affirmed that they were based on unsound principles, and were destined to pass into oblivion. When treatment was necessary, each case should be carefully considered; bad habits, irregular and insufficient meals, should be corrected, and care should be taken to avoid the curse of habitual pill-taking. As far as possible the bowels should be left alone to work out their own salvation.

Dr. H. D. Rolleston believed that Dr. Goodhart had unduly minimized the bad effects which might result from constipation. The

personal equation was of great importance; in exceptional cases no harm resulted, but in others they must admit the possibility of intestinal auto-intoxication, and he must register a protest against putting this out of court altogether. He wished to refer to three causes of constipation: (1) Want of tone of the muscular coats of the intestine, especially one form accompanying the condition of hypothyroidism. The administration of doses of thyroid often cured the constipation. (2) Constipation due to excess of tone—spastic constipation. In some cases there was a reflex cause in the abdominal cavity, and in these it was often cured by giving belladonna or opium. (3) Constipation due to diminished quantity of fluid, or to diminished secretion, which should be treated by giving more fluids.

Sir James Sawyer laid down three canons in regard to treatment: (1) Do not leave the question of medicine to the patient; (2) Do not prescribe drugs until it is certain the case cannot be cured without them; and (3) Employ a conjoined use of adjuvants of the natural methods of alvine relief. He then discussed the part played by certain factors in the production of constipation, including the neglect of the natural impulse, the use of too high lavatory seats, the neglect of the psoas and iliacus muscles, and the habitual abstinence from fruit. After breakfast was the most satisfactory time for evacuation, except in persons with piles, who should accustom themselves to defæcation at night. An effort should be made at the usual time, whether the desire were present or not. The best position for defæcation was the crouching attitude. He urged that slouching, stooping, and sitting in large arm-chairs might all interfere with the normal action. He agreed that the best diet was a mixed one, and insisted on the value of daily bodily exercise. For some cases, a pill made of **Myrrh, Socotrine Aloes,** and **Cassia pulp** given at bedtime was of great value.

Dr. A. F. Hertz pointed out the importance of determining what part of the alimentary canal was at fault, and showed lantern slides giving the results of X-ray examinations after bismuth meals. On an average, the cæcum was reached in 4½ hours, the hepatic flexure in 6½, the splenic flexure in 9, the sigmoid colon in 12, and the junction of the pelvic colon and rectum in 18. He divided cases of constipation into two classes, those in which the delay occurred in the small or large intestine, and those in which the delay was occasioned in the evacuation from the rectum, a condition which he called dyschezia. The first variety could be influenced by diet, massage, and drugs; the second by such measures as re-education, exercises, the squatting position in defæcation, enemata, and suppositories. He showed lantern slides demonstrating the effect of a stimulating as compared with a non-stimulating diet upon the passage of the food through the large intestine. Massage was useful, but it was necessary to employ bismuth and the *x*-rays to determine where it should be applied. Purgatives might hurry on the contents too much, and so interfere with nutrition; therefore, the smallest quantity that was effective should be given.

He quoted experiments to demonstrate that sodium and magnesium sulphates completely evacuated the large bowel without affecting the passage through the small intestine. The condition of dyschezia was more common than was generally supposed. It was important to attempt to evacuate the bowel, even though no desire was felt.

Gompertz[2] has found by administering lamp-black to healthy individuals, that the food normally traverses the alimentary canal in from twelve to fifteen hours. He divides cases of constipation into the atonic and the spastic. In the former variety there are no specific symptoms; in the latter, colic and flatulence are usual. He believes in constipation leading to auto-intoxication, and is of opinion that psychical symptoms (e.g., temporary loss of memory), albuminuria, skin diseases, arteriosclerosis, and other conditions may be the result of it.

For successful treatment it is exceedingly important to ascertain the factors producing the condition. A few of the most frequent causes are: (1) Dietetic errors, a too perfect absorption of food substances; (2) Gastrogenic constipation, increased acidity of the gastric juice; (3) Irregular habits, the outcome of carelessness; (4) Insufficient exercise, sedentary habits, and obesity; (5) Nervous influences, hysteria, diseases of the nervous system; (6) Drugs; and (7) Local obstructions, stenosis of the intestinal tract due to neoplasms, etc. Hyperacidity of the gastric juice is an important etiological factor, resulting in the so-called cases of gastrogenic constipation. In a series of 100 cases of habitual constipation, 87 showed an increased acidity, after an Ewald-Boas test breakfast. On the other hand, in diarrhœa, an analysis of the stomach contents regularly showed a decreased acidity. Constipation due to hyperacidity has been explained by Strassburger, who believes that the strong disinfectant influence of the increased hydrochloric acid causes a more perfect disintegration and sterilization of the food, thereby diminishing the number and retarding the growth of intestinal bacteria. Thus, the putrefactive changes in the bowels are decreased to such an extent that the natural irritation is removed, causing a lessened peristalsis, with resulting constipation. The microscopic examination of the excrement usually discloses the residue to be mostly detritus.

Gompertz speaks highly of **Agar-agar** in treatment. He employs 15-gram doses morning and evening, usually with milk or cream, and finds it usually produces normal stools within about three days. The dose may then be gradually reduced, and finally stopped altogether in some cases. (See also *page* 44, under **Phenolphthalein**).

REFERENCES.—[1]Abst. in *Lancet*, Aug. 13, 1910; [2]*Amer. Jour. Med. Sci.* Oct. 1909.

CORYZA, ACUTE (Common Cold). *Robt. Hutchison, M.D.*

This subject was dealt with at considerable length in last year's *Medical Annual*, but Benham has since published the results of further researches into the bacteriology of the condition.[1] He found that the causal factors in the majority of the cases investigated in the

winters of 1907–8 and 1908–9 were the *Micrococcus catarrhalis* and the *M. paratetragenus*; the *Bacillus septus* was also present in a number of cases.

TREATMENT.—Benham's experience of the **Vaccine** treatment of colds leads him to believe that there are good grounds for hoping that it will prove succsssful.

Campbell[2] lays stress on overfeeding as predisposing to colds, and advises a reduction of the starches and sugars in the diet of those who are liable to be affected. He believes in **Quinine** in doses of 3 to 4 gr. three times a day as a prophylactic. He also praises the vaccine method, and gives the following directions for collecting material for the preparation of the vaccine :—

For receiving the secretion from the inflamed mucous membrane of the nose, throat, or air-tubes, small wide-necked bottles fitted with glass stoppers are required. These should be sterilized by boiling. When it is desired to collect the nasal secretion, the external nasal orifices, which always contain an abundance of micro-organisms, should be washed with warm soap and water, and dried with a clean towel. One nostril is then closed and the discharge is expelled direct into the bottle.

The best time to collect a sample of the discharge from the nasopharynx, the throat, or the tubes, is the first thing in the morning, when it is least likely to be mixed with food-particles, and when, moreover, a "uniform smear" (i.e., one in which the contained micro-organisms are present in their true proportion) is most likely to be secured. The secretion should be hawked up or coughed up into the bottle; but prior to this, the teeth should be thoroughly brushed, the mouth rinsed, and the throat gargled with boiled or, preferably, distilled water, after which some of the pure water should be swallowed. Having secured the specimen, it is forwarded to an expert, and the vaccine can be prepared ready for use within forty-eight hours of its receipt.

The best time for the injection is the evening, and the best spot the flank, slightly above and internal to the anterior superior spine. If the reaction is pronounced, it may be necessary to keep the patient in bed for twenty-four hours. An ordinary hypodermic syringe may be employed. It should be boiled in water before use (some prefer to boil the needle in absolute alcohol), and the skin of the spot selected for injection should be well rubbed with a piece of cotton-wool soaked in a mixture of alcohol and ether, or in a 2 per cent solution of lysol. It is always advisable to begin with a small dose (e.g., 120 million organisms), and to regulate subsequent doses according to the resulting reaction, the subsequent bacterial findings, and the effect upon the local secretion. As a rule, the second injection should be about ten days after the first. We do not seek to produce any reaction when the injection is administered during an acute cold, but in the case of chronic inflammatory conditions, or for prophylactic purposes, we endeavour to produce a definite but not too pronounced reaction. Such a reaction displays itself as a tender red swelling at the seat of the injection (which appears in from four to eight hours, and begins to subside in about eighteen to twenty-four hours), and in the form of constitutional symptoms, such as fever and headache, which set in a few hours after the injection, and subside during the second twelve hours.

REFERENCES.—[1]*Brit. Med. Jour.* Nov. 6, 1909; [2]*Pract.* Oct. 1909.

COUGH.

(*Vol.* 1910, *p.* 67)—For spasmodic, dry cough (as in whooping-cough and asthma) infusions of **Wild Thyme** (*Thymus serpyllum*) is recommended. For children of one year 0·5 gram, and for older children up to 1·2 gram, is infused with 100 parts of water, and given during the twenty-four hours

CYSTICERCUS.

Ethereal Ext. of **Filix Mas** in (*page* 30).

DEAFNESS.

Electricity in (*page* 93). (*See also* EAR, DISEASES OF.)

DELHI BOIL. (*See* LEISHMANIASIS.)

DELIRIUM TREMENS.

Veronal, in early stage (*page* 65).

DEMENTIA PRÆCOX. *Bedford Pierce, M.D., F.R.C.P.*
Norah Kemp, M.B., C.M.

The term dementia præcox is becoming firmly established, and to an increasing extent the name is used by authorities as if it connotes a definite disease entity. Little, however, has been done to define more clearly the symptoms of this condition; the delimitation of the clinical features is by no means satisfactory, whilst the pathology remains altogether obscure.

Robert Jones[1] expresses the opinion that this form of insanity is more common than formerly, and that the proportion as compared with all forms of insanity has risen in twenty-five years from 21·5 to 31·2 per cent. It is difficult, however, to be sure that this increase is not in large measure an apparent one, owing to the classification of cases having been modified during this time. Jones also refers to Koch and Mann's researches, which suggest that in this disease there is an acute destruction of the nucleo-proteids and sulphur-containing substances, due apparently to some obscure auto-intoxication. Microscopically there is said to be a reduction in the number of pyramidal cells and other changes in the cortex, but it is not stated whether these degenerative changes are in any degree distinctive.

Southard[2] gives a review of the conflicting views as to the pathology of dementia præcox, one school "describing it as a species of intoxication with brain damage, and the other as a dissociative mental disease without structural damage to the brain." He refers to Alzheimer's work on split-products of nerve-cell and fibre metabolism, and his contention that katatonic excitement can be distinguished from mania histologically, as the former only would exhibit amœboid glia cells. This, however, would not suffice to distinguish severe katatonic conditions from toxic delirium and certain severe bodily diseases. Southard, feeling that diffuse cerebral changes appeared unlikely to throw light on the mechanism of dementia præcox, endeavours to demonstrate the existence of localized lesions, such as focal scleroses and atrophies affecting certain cerebral areas. He quotes in detail fifteen cases in which minor macroscopic lesions were discovered post mortem; these were selected as suitable for special studies, and a chart is given showing the affected localities. These were classified in: (1) A pre-Rolandic group; (2) Post-Rolandic group; (3) Infra-Sylvian group; (4) Cere-

bellar group. Paranoidal symptoms seemed to be associated with prefrontal lesions, katatonic symptoms with post-central-superior parietal and cerebellar lesions. He claims that these findings are in harmony with modern physiological teachings.

REFERENCES.—[1]*Lancet*, 1910, p. 1745; [2]*Bost. Med. and Surg. Jour.* Aug. 4, 1910.

DERMATITIS. *E. Graham Little, M.D., F.R.C.P.*

1. *Dermatitis Produced by Flowering Plants or Insects.*—Foerster[1] reports a number of cases occurring in his practice of dermatitis due to contact with *Primula obconica*. The reaction may be of three types: (*a*) An intense inflammation, erythemato-vesicular and bullous, accompanied by œdema; (*b*) An erythemato-vesicular or erythemato-squamous eruption, with considerable infiltration; (*c*) An itching or burning sensation confined to the pulps of the fingers, which are puffed, tense, and slightly reddened. The history of regularity or periodicity of the attack may offer an important and suggestive clue. The distribution is usually on the hands, forearms, and face, including the ears. The eruption is generally limited to the parts in actual contact with the irritant, and does not spread beyond those areas, as is the case with the eruption due to poison-ivy. The duration of a single attack may be from five days to two weeks. Although a certain idiosyncrasy to the irritant may be noted in some persons, it is probable that few persons are entirely immune; and an apparent early immunity may be succeeded by an exaggerated susceptibility. The rapidity with which symptoms may develop after contact varies greatly: from a few hours to fourteen days are the limits of recorded cases; after repeated attacks the incubation period may be shortened. The source of the irritant is probably chemical, and found in the secretion of the plant; it is not due, as has been supposed, to the mechanical injury to the skin caused by the hairs of the plant. Nestler was able to demonstrate that the eruption could be produced by crystals obtained from the residue left after flooding the leaves with ether. The dry as well as the fresh leaves contain the irritant, and the poison may be transferred to inanimate objects such as gloves, which may subsequently serve as carriers.

Inasmuch as the toxic constituent is soluble in alcohol, ether, and chloroform, if the parts exposed to contact are rubbed over with one of these solvents immediately after contact, the reaction may be mitigated. When fully developed, the principles of treatment are the same as for any other acute inflammation.

Walsh[2] investigated the causes of an eruption prevalent amongst pickers and growers of the daffodil and the narcissus in the Scilly Isles. From local information it would appear that abrasions of the skin predispose to the inflammatory reaction of contact. A succus, a tincture, an alkaloid, and an essential oil were isolated from the fresh flowers by Messrs. Bullock, pharmaceutical chemists; experimental rubbing of these products on the skin, slightly abraded as a preliminary,

was followed by a severe inflammation after using the succus, less severe with the tincture, and by no reaction with the oil. None of these products caused reaction on the unbroken skin.

Brown-tail Moth Dermatitis.—The importance of this cause of skin disease in the United States is evident, from the fact that Dr. Hyde devotes a new chapter to its consideration in his last edition.[3] The irritation is produced by the barbed hairs of the caterpillar-stage, which pierce the skin, even, it is said, penetrating into the corium, and producing severe symptoms. Potter[4] figures the moth and caterpillar, and describes a case of this dermatitis, typical of sixty cases which he has seen. The lesions appear first as macules, which develop into urticaria-like papules, and appear on parts exposed to contact with the cocoons of the caterpillar. The hairs seem to get into the clothing of the victims, and piercing the skin, produce a breakdown of the rouleaux of red-blood corpuscles, so that the action is thought to be chemical rather than mechanical; their irritation-producing property is destroyed by raising to a dry heat of 115° C. The dermatitis may be very intractable. Potter recommends inunction with **Carbolic Oil** (2 per cent) or **Carbolized Zinc Ointment.** Hyde says that actual excision of the minute barbed hair may be needed to effect a cure.

2. *Dermatitis Due to Drugs*:—

Bichromate of Potash.—Two cases of this causation are reported.[5] In the first case the arms, upper part of chest, neck, and face were the seats of a vivid erythema passing into a papular and eczematous eruption; in the second case the eruption did not spread higher than the throat. Both cases occurred in men engaged in dyeing, a process in which chrome preparations are used. It was experimentally shown that particles of the salt are carried for a distance of at least eighteen inches in the vapour of steam from the boiling vats. Where the skin was broken, or when there was much perspiration, the effects were more marked. The orifice of the nose was an especially susceptible part, and the suggestion is made that this and other susceptible positions should be washed with a reducing agent, such as weak bisulphite of soda, as a preventive measure. Cessation of contact is speedily followed by cure.

Metol.—This has long been known as a reagent likely to produce irritation by contact. Northcote[6] relates a personal experience with it, and as a preventive urges the use of rubber finger-stalls, and free washing after the contact.

Menthol.—Mackenzie[7] reports a series of cases of dermatitis of the nasal vestibule due to menthol used in a proprietary spray, the proportion being 2½ per cent in a vehicle of liquid paraffin. The symptoms ceased on reduction of the strength of the formula to 1 per cent. The same ingredient in the form of oil of peppermint has been the cause of dermatitis from the use of dentifrices containing it.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Aug. 20, 1910; [2]*Brit. Med. Jour.* Sept. 24, 1910; [3]*Dis. of the Skin* (8th ed. Bailliere, Tindall, & Cox); [4]*Jour. Amer. Med. Assoc.* Oct. 30, 1909; [5]*Lancet*, Jan. 29, 1910; [6]*Ibid.* Sept. 11, 1910; [7]*Laryngol.* June, 1910, p. 301.

DERMATITIS ARTEFACTA. *E. Graham Little, M.D., F.R.C.P.*

Walker[1] relates a humorous case of dermatitis produced voluntarily, the patient applying to herself carbolic acid, which escaped detection in spite of six months' careful observation, and was finally demonstrated only when she was taken into a ward and closely watched. The patient concealed a small bottle of the acid in her handkerchief. She had produced repeated sloughing of the fingers, hand, and forearm, on the right side, which is less usual than the left. She bore an exemplary moral character, being described by her doctor as "one of the most industrious, sensible, and conscientious girls" in his town. There was well-marked anæsthesia of the palate, which is a valuable corroborative sign of these hysterical self-mutilations. Two other less remarkable cases are recorded in less detail; in one, a very unusual feature was the selection of the face for artificial disfigurement, in a handsome well-to-do girl of twenty-two. The best criterion of these cases is the bizarre and inexplicable distribution and aspect of the lesions. The only treatment, following detection, is moral persuasion "not to do it again."

Reference.—[1]*Brit. Med. Jour.* June 18, 1910.

DERMATITIS EXFOLIATIVA. *E. Graham Little, M.D., F.R.C.P.*

Bowen[1] has had a somewhat unique opportunity of getting autopsies in three out of seven cases of the disease which is most conveniently known under the title he chooses. Whether the cases can all be accepted as the same pathological condition is a question which would be answered differently by different authorities. Bowen recognizes four forms: (1) Recurrent scarlatiniform desquamation; (2) Dermatitis exfoliativa (Wilson); (3) Dermatitis exfoliativa following other diseases; (4) Pityriasis rubra (Hebra).

In the five fatal cases recorded, one was subsequent to a local eczema, and another to a dermatitis produced by mercurial ointment. There was no constant feature in the three autopsies beyond the exfoliation of the skin. In one case, slight growth of streptococci was obtained from the heart's blood. As tuberculosis has been supposed to be a factor in this disease, it is interesting to note that of the three autopsies, one showed chronic pleuritis with purulent bronchitis, one obsolete tuberculosis of bronchial glands, and one bronchopneumonia. In another fatal case, not post-mortemed, death seemed to be due to intestinal obstruction. No treatment seemed to be of any avail. Jackson[2] had an apparent recovery of a case of general exfoliative dermatitis after giving 30-gr. doses of **Quinine** daily for some four weeks.

Reference.—[1]*Jour. Cutan. Dis.* Jan. 1910 [2]*Ibid.*

DIABETES. *Francis D. Boyd, M.D.*

During the year a number of papers have been published on the treatment of diabetes, all marking the reaction from a too purely protein diet. Lépine[1] points out that it is customary in nervous patients to speak euphemistically of glycosuria rather than of diabetes,

and to urge that no prognostic conclusion can be drawn from the sugar quantity. In simple cases of diabetes there is only one indication for treatment, namely, the lessening of the hyperglycæmia. One can frequently, through simple changes in the mode of life, regulation of exercise, or diminution in the total diet, attain this end. Invalids who are too heavy have to be treated for obesity, and are more easily dealt with than the emaciated. If in a fat individual the urea excretion does not exceed 0·4 gram per kilo of body weight (roughly about 3 gr. per lb.), meat need not be restricted. Bread can be replaced by light biscuits, gluten preparations, and potatoes. Of fruits, dates and figs are strictly forbidden, but nuts and almonds are permitted. In consequence of a tolerance for levulose, many patients can do with small quantities of cane sugar and honey. Milk diet may suit when it takes the place of over-feeding. Cheese, which is so useful, must, however, be watched with care on account of the possibility of forming sugar from albumin. As long as there is no acetonuria, fat may be used freely. Alcohol is useful as long as the liver and bowel show no contraindications. White wine, however, must be avoided, as it seems to contain unknown but harmful substances for diabetics. When green vegetables cannot be used on account of bowel disturbance, and a full meat diet leads to indicanuria, thin vegetable soups in conjunction with medicinal substances will help. Lépine has found benefit from antipyrin, quinine, and salicylic acid preparations, which appear to act by retarding glycogenic conversion. Opium preparations are valuable, especially if pain or insomnia be present. Bromide salts are less useful. Arsenic and phosphorus may be prescribed with a view to improving nutrition, but must be used with care. Alkalies are as a rule useful, but have been known to increase glycosuria.

Rosenfeld[2] points out that in many cases of diabetes, while we can keep the urine free from sugar by dietetic measures, we do not increase the patient's tolerance for carbohydrates. It is not advisable to force the patient to live with a minimum quantity of carbohydrate. Diet restrictions should be relative. Under no circumstances should the carbohydrate be reduced below two ounces of bread-stuff unless in very recent cases. The important point in treatment to discover is, Can the diabetic oxidize carbohydrate, and how much? If a carbohydrate were known which every diabetic could oxidize, then the chief therapeutic difficulty could be overcome, for the total withdrawing of carbohydrate results in the production of acetonuria. The rectal administration of sugar does not increase glycosuria, but it has no anti-acetonuric influence.

Considerable attention has been devoted to the discussion of the **Oatmeal Cure.** Lampé[3] considers the diabetic can metabolize the carbohydrate of oatmeal when the metabolism of other carbohydrates is impossible. The diabetic has not lost the power of converting the carbohydrate of oatmeal into glycogen. He considers that we may conclude that the starch molecule of different kinds of plants is not identical, as has hitherto been accepted. Naunyn, however, does not

believe in the elective tolerance for the carbohydrate of oatmeal, but postulates a beneficial action of the products of the oatmeal which are formed in the bowel. What is the nourishing value in calories which those products possess eludes tabulation, but being easily oxidizable they are of great value to the diabetic in combating acidosis. Von Noorden is sceptical of Naunyn's opinion, for he thinks the bowel would resent such ferment processes, and show symptoms of intestinal indigestion with meteorism. He thinks that there are various possibilities—unknown products in the meal which in a specific way influence carbohydrate conversion in the liver or alter the kidney filter, or that the carbohydrate of meal behaves in the body differently from other carbohydrates. Luthje describes the benefit to the power of oatmeal starch in stimulating ferment action. Klotz[4] carried out a number of experimental observations, from which he concludes that wheat-meal or wheat-starch either leave glycosuria and acetonuria uninfluenced, or increase them, because the metabolic processes end in sugar which cannot be utilized. With barley-meal and oatmeal metabolism of the carbohydrate takes place by the anglycogenic and anhepatic way, and they are thus tolerated by the diabetic. Occasionally, however, cases are met where this does not pertain, and where oatmeal has no beneficial influence. An analogy is drawn between glycerin and oatmeal. Glycerin given by the mouth may in one diabetic go the hepatic way and lead to increased glycosuria, and in another diabetic go the anhepatic way and noticeably lower glycosuria. Klotz points out that we should not forget that we have to reckon with an unknown factor in the flora of the bowel, and he supports Naunyn's view that intestinal bacterial action may have an influence on the oatmeal cure, for there can be no doubt that under the oatmeal there is a great increase in intestinal bacteria.

Riedisch[5] finds that **Atropine** has a more marked influence on sugar excretion than any other medicinal substance. It is well borne in large doses if given continuously and in gradually increasing doses. With atropine, glycosuria disappears far more rapidly than with dietetic treatment alone. Smith,[6] again, advocates the administration of **Iodide of Calcium,** and records a number of cases where benefit followed its use. Crofton[7] records a case treated with **Pancreatic Extract** where benefit resulted.

Lépine[8] strongly advocates the use of **Alkaline Injections** in acetonuria, whenever the urine shows a considerable quantity of acetone bodies. It is best to employ an isotonic solution of bicarbonate of soda, of the strength of 17 grams to the litre ; of this, two litres can be administered intravenously.

(See also *page* 50 for the use of **Soya Bean.**)

References.—[1]*Rev. de Thér.* vol. lxxviii. Nos. 8 & 9 ; [2]*Berl. klin. Woch.* 1909, No. 21 ; [3]*Zeits. f. diät. u. phys. Ther.* Bd. xiii. 1 & 4 ; [4]*Berl. klin. Woch.* 1910, No. 37 ; [5]*Jour. Amer. Med. Assoc.* Oct. 1909, p. 1366 ; [6]*Pract.* Feb. 1910, p. 266 ; [7]*Dub. Med. Jour.* May, 1910, p. 332 ; [8]*Rev. de Méd.* 10 Jan. 1910.

DIAPHRAGM, ADHESIONS OF. *Joseph J. Perkins, M.B., F.R.C.P.*

Bassenge[1] calls attention to the value of radiography in the exact diagnosis of adhesions of the diaphragm, the result of old pleurisy, which are often the cause of fixed pain, leading to difficulty of inspiration and inability to work. In the six reported cases the presence of some abnormality impeding the action of the diaphragm was made plain by this means, a localized kinking or scalloping of the surface being observed at some point during its descent, while occasionally a shadow corresponding to the adhesion was visible.

REFERENCE.—[1]*Med. Press*, Dec. 8, 1909.

DIARRHŒA, CHRONIC. *Robt. Hutchison, M.D.*

Bickel[1] discusses the pathology and treatment of nervous diarrhœa. He recognizes two varieties: (1) Psychical, (2) Reflex. In the former the diarrhœa is excited by mental or emotional causes; in the latter, it depends upon an exaggerated irritability of the intestinal nerve-mechanism, by which it becomes over-sensitive either to all stimuli or merely to specific substances (e.g., special articles of food) which do not produce such an effect in ordinary persons.

TREATMENT.—He disapproves of the use of astringents except in acute exacerbations, when rest in bed and opium may be necessary. The use of these measures, however, should be reserved for the severest cases. In the **Dietetic Treatment** no precise rules can be laid down, but every case must be treated separately, individualization being essential. **Suggestion** plays a large part in treatment, it being important to impress upon the patient that the condition is purely a functional one, and attempts should be made to divert his attention from the abdomen. **Hydrotherapeutic** measures are of great service as general tonics (e.g., cold hip-baths, douches, etc.). A "cure" at a moderate altitude, preferably in a special sanatorium, is advisable in some cases.

Palier[2] attributes some cases of chronic diarrhœa to "pyloric insufficiency," and states that they can be successfully cured by **Hydrochloric Acid.** Large doses are unnecessary, ten drops twice a day being sufficient. There seems to be no difference, however, between the condition he describes as pyloric insufficiency, and achylia gastrica, in which, as is well known, chronic diarrhœa is a common symptom which can be controlled by hydrochloric acid.

REFERENCES.—[1]*Berl. klin. Woch.* Mar. 14, 1910; [2]*N.Y. Med. Jour.* Jan. 29, 1910.

DIARRHŒA, INFANTILE. *Prof. G. F. Still, M.D.*

The etiology of infantile diarrhœa must remain unsolved so long as observers seek to find one explanation for all cases; it is abundantly evident that there are many causes, and that we cannot even suppose that these are all bacterial. Grulee[1] points out that the *Bacillus dysentericus*, the Shiga bacillus, although a few years ago it was thought to account for a large proportion of the cases of summer diarrhœa, has now been shown to account only for a small proportion: for instance,

he and Dr. Welch found it only once in the stools of seventeen cases of diarrhœa. A *Streptococcus enteritis* has been described by Escherich, and it is stated that this can be recognized by the finding of streptococci in large numbers in the stools at the first onset of the attack ; in such cases there are apt to be complications such as nephritis and peritonitis. Other micro-organisms have been found in various epidemics of infantile diarrhœa. Grulee holds that the diarrhœa is usually not due to any bacterial infection of the intestinal wall, but to a disturbance of metabolism, or to decomposition of the food ; and that congestion, and even ulceration, of the intestinal wall may be produced by the poisons of perverted metabolism or decomposing food, just as readily as by the toxins of bacterial origin.

In opposition to these views are recent observations by Lucas Fitzgerald and Schorer,[2] who found dysentery bacilli in thirty-eight out of forty-five cases of " infectious diarrhœa " in infants.

La Fetra,[3] recognizing that diarrhœa is not due to bacteria only, points out that certain foodstuffs are liable to produce diarrhœa in infancy—thus, carbohydrates present in excess of the digestive and absorptive capacity undergo fermentation, with the formation of lactic, acetic, succinic, and butyric acids. These acids, although of value in some cases in checking the activity of certain putrefactive bacteria, may, nevertheless, excite diarrhœa, with light, acid, frothy stools, acrid, and excoriating to the buttocks.

Maltose is a form of sugar which, like cane sugar, is apt to set up fermentation changes in the bowel, producing diarrhœa, which it also favours by stimulating peristalsis.

Treatment.—*Dietetic.*—La Fetra (loc. cit.) advises that only such food should be given as is digested and absorbed high up in the alimentary tract, and food which leaves but little residue : at first only water, or barley-water plain or dextrinized. After a few days, when the temperature is down to 100° F., a teaspoonful of boiled skimmed milk may be added, and be cautiously increased as the infant is found able to tolerate it. If there is much putrefaction, as shown by foul stools, then buttermilk or refined skimmed milk, with or without some cereal decoction, should be given. Albumen-water he considers results in intestinal putrefaction unless given in too small quantity to be of nutritive value ; it is, he thinks, too good a culture-medium for bacteria. The number of feedings should be reduced to the lowest possible, whether the infant be breast- or bottle-fed, for food taken into the stomach excites a peristaltic wave which may even reach the rectum. Animal broths and peptones excite peristalsis, and are therefore to be avoided. Boiled milk, with rice, barley, arrowroot, or wheat-flour gruel, are the best foods to use at first ; the milk may sometimes be best given skimmed and without sugar. Malted foods are to be used only with caution. La Fetra says that many infants are starved too long after diarrhœa, and the prolonged use of barley-water is responsible for many of the severe cases of malnutrition seen at the end of the summer. As soon as possible the return should be made to whole milk,

with cereal decoctions. Yolk of egg, if it be not vomited, is of great value in overcoming the anæmia left by diarrhœa.

In cases where the diarrhœa depends upon colitis rather than entero-colitis, a larger amount of proteid and carbohydrate can be given. Grulee (loc. cit.) considers that a diet of mere watery fluid, such as barley-water or weak tea, should be continued for from twenty-four to forty-eight hours; but that after this, whether the diarrhœa is stopping or not, there is nothing to be gained by further starvation. The next step in diet is skimmed milk, which is more readily digested when boiled; this is given in the proportion of 1¼ to 1½ oz. in the twenty-four hours for every pound of the child's weight, and is diluted so as to afford enough in quantity at each feeding; the food is to be sweetened with saccharin instead of sugar, and given at four-hourly intervals. Gradually the skimmed milk is to be replaced by whole milk.

Banana Flour and **Plantain Meal** are recommended by Vipond[4] as specially suitable for the feeding of infants with diarrhœa. The particular virtue of these flours is their astringent effect, due to about 1 per cent of tannin in their compositions; they contain a large quantity of starch; the total carbohydrate in the dry flour is over 80 per cent. Vipond does not state how the flour is to be used.

Soybean Flour is stated by Ruhräh[5] to be of great value as a thin gruel or decoction mixed with a little barley or other cereal, as a temporary food for infants with diarrhœa; it is seldom vomited, and does not aggravate the diarrhœa. **Acorn Coffee** has been found useful by Dörfler.[6]

Medicinal.—If vomiting is associated with the diarrhœa, Grulee (loc. cit.) says that **Stomach-washing** may be necessary; but often the preliminary **Starvation Diet** is sufficient to stop the vomiting. **Bismuth** is of value in some cases, but is seldom necessary. If the temperature is raised, as it often is in cases of infantile diarrhœa, **Irrigation of the Colon** may reduce it, and Grulee thinks this is more valuable for its antipyretic effect than for cleaning out the bowel. **Antipyrin** is sometimes very useful when there is not only fever but delirium. If distention is troublesome, as it may be in the more protracted cases, the introduction of a tube into the rectum may draw off flatus, or the colon may be irrigated, or **Hot Turpentine Stupes** may be applied to the abdomen. Collapse calls for **Mustard Packs,** followed by saline infusion. **Calomel** and **Intestinal Antiseptics,** which have long been used, and by most observers have been found very useful in infantile diarrhœa, Grulee thinks are seldom to be recommended; calomel, in particular, he thinks, may even do harm by irritating an already irritated bowel. **Astringent Injections** into the bowel by enemata are recommended by Dörfler (loc. cit.): for instance, **Tannic Acid,** a heaped teaspoon in nearly two pints of water; the irrigation to be done twice daily, for eight days if necessary. **Lead Acetate** has also been used.

References.—[1]*Jour. Amer. Med. Assoc.* Aug. 14, 1909; [2]*Ibid.* Feb. 5, 1910; [3]*N.Y. Med. Jour.* Nov. 27, 1909; [4]*Montr. Med. Jour.* Aug. 1910; [5]*Jour. Amer. Med. Assoc.* May 21, 1910; [6]*Münch. med. Woch.* Ap. 19, 1910.

DIPHTHERIA. *E. W. Goodall, M.D.*

Clinical.—*Hæmorrhagic diphtheria* is defined by J. D. Rolleston[1] as a form of diphtheria in which, "in addition to other signs of malignancy, hæmorrhages appear in the skin at an early stage of the disease, with or without hæmorrhages from the mucous membranes." Out of 1550 cases of diphtheria treated in the Grove Hospital during six years, 78 were hæmorrhagic, or 5 per cent. This form is confined to children, but is not affected by season, sex, or previous health. The severity of attack is usually due to neglect of treatment at an early stage, but sometimes to precocious malignancy. Reaction to antitoxic serum is delayed, and the usual sequelæ of serum treatment are much less frequent in hæmorrhagic than in milder forms of diphtheria. The mortality of hæmorrhagic diphtheria is very high, over 80 per cent; and all the cases which recover are affected with severe and extensive paralysis. The treatment consists of large doses of serum (30,000 units and over), and frequent administration of adrenalin.

J. D. Rolleston[2] investigated the presence of Babinski's sign in 877 cases of diphtheria. He came to the conclusion that it has no special diagnostic significance, since it occurs in such diseases as scarlet fever, enteric fever, and lobar pneumonia. It is less common, however, in non-diphtheritic sore throat than in diphtheria.

A short communication on *cutaneous diphtheria* was made by G. W. Dawson[3] at the annual meeting, 1910, of the British Medical Association. He gave brief accounts of ten cases, four of which he had seen himself. the other six he had collected from various journals. He writes as follows regarding the clinical appearance of most of the cases: "The commonest, and therefore most typical form occurs in children, and has the appearance of an impetiginous eczema, nearly always affecting the head and face, and associated with severe conjunctivitis, sometimes with otorrhœa and rhinitis, the whole forming a clinical entity from which a diagnosis may be deduced with some degree of confidence." The treatment is by antitoxin. [In one of the quoted cases the clinical condition was one of extensive gangrene of the skin rather than impetigo or eczema.—E. W. G.]

Diagnosis.—It has been known for a considerable time that so far as the appearance of the local lesions is concerned, inflammation accompanied by the formation of membrane caused by streptococci is hardly to be distinguished from that caused by the Klebs-Löffler bacillus. The clinical symptoms are, however, very different. Orgel,[4] of New York, has recently given an account of several cases coming under his own observation. The onset was sudden, with chills, vomiting, and a temperature of 104° to 105° F. The patients were restless, apathetic, and in some cases delirious. The tonsils and pharynx become red, and are rapidly covered with a dirty yellowish membrane, at first easily removed. The posterior nares may be invaded. The cervical glands become much swollen, and not infrequently suppurate. There may be albuminuria and even nephritis.

When the exudation clears up, ulceration is left. The illness may last for three or four weeks, and may prove fatal. The writer found that in his cases antistreptococcic serum had no effect. The only treatment he found to be of value was spraying the fauces with **Peroxide of Hydrogen,** douching the mouth and nose with **Salt Solution,** and applying an **Ice-bag** to the neck.

TREATMENT.—In a paper entitled "Laryngeal diphtheria experiences," C. H. Shutt[5] states that he has known two cases in which the sudden blocking of an intubation tube with membrane has led to the rapid death of the patient from asphyxia. One of the cases occurred in private, the other in hospital practice. Intubation should certainly not be performed in private practice, for fear of the accident mentioned. The occurrence of this accident (death, that is, from sudden blocking of the tube) is very rare in hospital practice. In the vast majority of cases the resident medical officer can reach the patient in time to give relief.

Mygind[6] relates a case of a boy, aged five years, who still continued to have the bacilli in the fauces several weeks after an attack of diphtheria. The patient was the subject of enlarged tonsils and adenoids. These were removed. The patient did well. Further cultures failed to show the bacilli. The author claims that, by the removal of the tonsils and adenoids, he removed the habitation of the bacilli.

PROPHYLAXIS.—The latency of the infection of diphtheria is discussed by R. M. Buchanan.[7] He adduces fresh evidence of the existence of the "carrier" case, and points out that such are met with most frequently in connection with clinical cases. He draws attention to the fact that "return" cases of diphtheria are rare; thus in Glasgow there were only 0·8 return cases per 100 diphtheria admissions during three and a half years.

It is admitted that the recognition of the diphtheria bacillus by cultural peculiarities and by its appearance under the microscope is not easy; yet it is usually a fairly rapid diagnosis that is required. Buchanan states that the following method is very helpful. Some ox-serum is coagulated in an equal quantity of water, and filtered. To one half, 1 per cent glucose, and to the other 1 per cent saccharin, are added. These two media are coloured with neutral red as an indicator, and placed in tubes. "In twenty-four hours a marked acid reaction is produced in the glucose tube by *Bacillus diphtheriæ*, in both the glucose and saccharin tubes by *Bacillus xerosis*, while no change is produced in either tube by the bacillus of Hofmann." The writer further states that the virulence of the diphtheria bacillus occurring in healthy subjects ("carriers" or contacts) is but slightly less than it is in persons suffering from diphtheria. It is important to remember that the bacillus is most tenacious of its virulence. According to Buchanan, infected contacts rarely develop the disease themselves.

Duncan Forbes[8] also discusses the question of the treatment of contact cases. He points out that the strict interpretation of the

words of the various Public Health Acts, "persons . . . . *suffering from* an infectious disease," might lead to awkward consequences, if they were attempted to be applied to contacts, and suggests that in future acts the word "*suffering*" should be omitted, and replaced by the words "*in an infective condition.*"

He gives details of the method employed at Brighton for dealing with contacts. If a case of diphtheria occurs in a private house, cultures are taken from the throats of all the members of the family: (*a*) If any member is a teacher or other person associating with children outside the house; (*b*) If any member sells or handles milk. Individuals are swabbed; (*a*) If there be a history of cold or sore throat; and (*b*) If suspicion rests upon them as probable carriers.

With regard to cases of diphtheria in schools, the "first action in such cases is to make inquiries at the school as to absentees from the same class who returned shortly before the onset in the patient. If such are found, and if the history of a sore throat or cold is elicited, swabs are taken. Swabs are also taken from all scholars present or absent in whom there is a history of sore throat or cold; (all absentees from the class are visited, and inquiries made as to the nature of their illness. *Even if the swabs are returned negative, all persons with sore throat are excluded for a clear fortnight.*" [The reason for this procedure does not appear to me to be very clear; Forbes's own explanation is as follows: "A diphtheria carrier who has a sore throat, because of other virulent infective organisms (usually cocci) in the throat, is much more infectious than a carrier of diphtheria bacilli alone. One believes, indeed, that in the absence of other virulent organisms, diphtheria bacilli cannot usually infect. It is obvious that if the above is our working hypothesis, we must exclude children with sore throats for a time, even although their swabs show no diphtheria bacilli, as these throats might provide complementary infecting agents."—E. W. G.]. At Brighton, infective contacts are sent to the diphtheria wards of the isolation hospital, where they are detained until their negative swabs are obtained from the throat and nose. Their average stay in hospital is thirty-three days. In the case of children, antitoxin is injected on admission. Cases in which Hofmann's bacillus only is found are disregarded.

Forbes states that in the very few instances of alleged "return" cases ("certainly not more than four in five years") negative cultures had been obtained from the supposed infecting case, i.e., the discharged patient.

In September, 1909, the Boston (U.S.A.) Health Department made a somewhat elaborate attempt to eradicate, if possible, diphtheria from the schools of the Brighton district of the city, by taking cultures from all the scholars, and excluding the bacillus-carriers till they were free from infection. An account of the details of the attempt has been published by Slack, Arms, Wade and Blanchard.[9] Upwards of 4,000 children were examined on two occasions at an interval of about a week. There were but few actual cases of diphtheria in the Brighton district

during the year. The following are most of the conclusions arrived at by these observers: At least 1 per cent of all healthy school children (in the Brighton district) are carriers of morphologically typical diphtheria bacilli. Such bacilli are communicable from one person to another, and the condition is usually a transient one. The organisms are ordinarily of little or no virulence. The disease, diphtheria, is kept alive in a community rather by virulent organisms in immune persons than by these non-virulent bacilli. When virulent diphtheria bacilli are present, as shown by outbreaks of the disease, cultural tests of all contacts, and isolation of those showing positive cultures, are a duty owed to the community. When the disease does not exist, isolation of carriers of probable non-virulent bacilli is of no proved value, and is a costly and laborious proceeding entailing much unnecessary hardship on innocent and probably harmless persons. The attempt to control diphtheria in a city by a round of cultures from all school children at the beginning of the school year does not seem encouraging from this series of tests. The proposition to stamp diphtheria out of a city by cultural tests of all the inhabitants and isolation of all carriers, is impossible from any practical standpoint.

REFERENCES.—[1]*Med. Press*, Oct. 13, 1909; [2]*Rev. Neurol. and Psychiat.* July, 1910, in *Lancet*, July 30, 1910; [3]*Brit. Med. Jour.* Sept. 24, 1910; [4]*Med. Rec.* Aug. 13, 1910; [5]*Jour. Amer. Med. Assoc.* Feb. 5, 1910; [6]*Ugesk. f. Læger*, Dec. 2, 1909, in *Sem. Méd.* Ap. 13, 1910; [7]*Laryng.* Feb. 1910; [8]*Ibid.*; [9]*Jour. Amer. Med. Assoc.* Mar. 19, 1910.

DROPSY.

Boerhaavia Diffusa, acts well in that caused by parenchymatous nephritis (*page* 21).

DRUG ERUPTIONS. *E. Graham Little, M.D., F.R.C.P.*

Bunch[1] contributes an elaborate classification of the usual drug eruptions under the heading of the lesions which predominate in each; some overlapping is inevitable, as the same drug may produce a mixed eruption, but the classification is useful if it is not taken too rigidly.

1. *Erythema maculosum, papulatum,* or *figuratum*: Quinine; belladonna and atropine; antipyrin; copaiba balsam, cubebs, gonosan; diphtheria and other antitoxins; potassium and sodium iodides; chloral hydrate.

2. *Erythema scarlatiniforme*: Salicylic acid and salicylate of sodium; quinine; mercury preparations, especially calomel.

3. *Urticaria, with or without erythema*: Antipyrin; iodides and bromides; salicylic acid and sodium salicylate; santonin and valerian; copaiba, cubebs, and turpentine.

4. *Papulo-pustular* lesions: Iodides and bromides; arsenic.

5. *Vesicular and bullous erythemata*: Preparations of iodine and bromine; copaiba balsam; sulphonal.

6. *Zoster*: Arsenic.

7. *Purpura*: Quinine; iodine and iodides; chlorate of potassium; salicylic acid and salicylates.

8. *Nodular or furuncular* lesions: Iodides and bromides.

External application of certain chemical substances may produce definite cutaneous lesions, which are well recognized in the so-called "trade eczemas" following the use of bichromate of potash, arsenic, lead, antimony, chlorine, camphor, creosote, and a host of other substances too numerous to mention.

REFERENCE.—[1]*Clin. Jour.* Aug. 3, 1910.

DYSENTERY, AMŒBIC. (*See* AMŒBIASIS.)

DYSENTERY (Bacillary). *J. W. W. Stephens, M.D.*

H. F. Hewes[1] advocates the use of a 5 per cent solution of **Nitrate of Silver.** A dose of magnesium sulphate is first given. After the motion a rectal tube is inserted for eight or twelve inches, and a pint or more of solution is injected. The injection should be retained for half an hour. Defæcation is then permitted, and after this, irrigation with saline solution is carried out. Another silver injection is given in about two days. The average duration of the cases under this treatment was ten days; while Shiga gives the duration of cases under vaccine treatment as twenty-five days.

REFERENCE.—[1]*Bost. Med. and Surg. Jour.* Ap. 21, 1910.

DYSPEPSIA, APPENDICULAR. *Robt. Hutchison, M.D.*

That chronic disease of the appendix may in some cases produce symptoms which closely simulate those of gastric disorder, seems no longer open to doubt. Both on the Continent and in America such cases have been recognized for some years, but the possibility of their occurrence has been brought prominently before the profession in this country by the recent publications of Moynihan,[1] Paterson,[2] and Soltau Fenwick,[3] and by a lively discussion to which the paper of the first-named of these writers gave rise.

The evidence in favour of the existence of an "appendix dyspepsia," or "appendicular gastralgia," as it has also been termed, is based upon the fact that, in numerous instances in which a patient has for long suffered from symptoms which were believed to point to the existence of a gastric or duodenal ulcer, no ulceration has been found at operation, but instead, the appendix has proved to be unhealthy, and after its removal all the gastric symptoms have disappeared.

The SYMPTOMATOLOGY of cases of appendix dyspepsia is indefinite; but all the usual symptoms of gastric or duodenal ulcer—including even hæmatemesis—may be present. Graham and Guthrie[4] found that both sexes were equally affected; but of Paterson's cases, a large majority were women. The average age is decidedly lower than in gastric ulcer, being about thirty-three years.

DIFFERENTIAL DIAGNOSIS.—Paterson deals with this question as follows:—"The chief conditions from which appendicular gastralgia has to be distinguished are duodenal ulcer, gastric ulcer, and gall-stones. Duodenal ulcer is the disease which gives rise to the greatest difficulty. The symptoms produced by it and by latent

appendicitis are very similar in many respects. There is often the same history of recurrent attacks; both duodenal ulcer and appendicular disease may give rise to hyperchlorhydria, and also to entire absence of free hydrochloric acid. Even 'hunger pain' may be a symptom of appendicular disease. The points which aid us in distinguishing the two diseases appear to be: (1) In duodenal ulcer the patient is usually free from symptoms between the attacks; in appendicular gastralgia, even between the attacks, the patient suffers from flatulence and discomfort after food. (2) The radiation of the epigastric pain towards the lower part of the abdomen is highly suggestive, if not diagnostic, of appendicular trouble. (3) The existence of tenderness over the appendix sometimes throws light on an otherwise doubtful case. (4) In many cases of appendicular gastralgia, the alteration of the gastric contents is not commensurate with the severity and duration of the symptoms. Duodenal ulcer most commonly produces, or is associated with, hyperchlorhydria, at any rate in the early stages; later, there is often absence of free hydrochloric acid. Appendicular disease may apparently exist for a considerable time without a marked alteration of the amount of free hydrochloric acid. The combination of marked symptoms of duodenal or gastric ulcer with a negative gastric analysis is suggestive of chronic appendicular disease. The cases of appendicular gastralgia associated with hyperchlorhydria perhaps present the greatest difficulty in diagnosis.

"In gastric ulcer, food, especially milk, often gives relief for the time being, the pain recurring one or two hours later. In appendicular gastralgia, the onset of pain is more variable; food, even milk, usually produces pain or discomfort at once. The dorsal pain so common in gastric ulcer is not present in appendicular gastralgia. In gastric ulcer the motility of the stomach is not usually impaired unless the ulcer is near the pylorus, in which case there is usually food retention. The pain in gastric ulcer or duodenal ulcer is rarely so severe and continuous that the patient has to take to bed. In several cases of appendicular gastralgia, on the other hand, the patients have had to lie up on account of the continuous and exhausting character of the pain. Another point which is helpful in distinguishing appendicular gastralgia from gastric or duodenal ulcer is this: the administration of bismuth and alkalies has little or no influence on the pain and discomfort due to appendicular disease."

As regards the last point, the present writer would mention that he has seen at least one well-marked case of appendix dyspepsia in which the pain was certainly relieved by alkalies.

The reason for the production of gastric symptoms in chronic appendicitis is unknown. Moynihan attributes them to "an exaggerated action of the pylorus," Soltau Fenwick to "gastric hypersecretion," Paterson to "intestinal toxæmia due to stasis."

TREATMENT of course is by operation, provided a diagnosis has been made; but owing to the inherent difficulty of doing this, Paterson

recommends that in doubtful cases medical treatment should first be tried for a period of six months.

In conclusion, it may be well to summarize some of the chief points in the papers above referred to :—

1. Appendicular disease may give rise to symptoms which closely mimic the supposed symptoms of gastric and duodenal ulcer.

2. The prominent symptom is epigastric pain or severe discomfort after food ; in many cases there are sour eructations, vomiting, and even hæmatemesis and melæna.

3. The radiation of epigastric pain to the lower abdomen is very suggestive of appendicular trouble.

4. Gastric analysis reveals, in some cases hyperchlorhydria, in others a normal amount of free HCl, in others a marked diminution or absence of free HCl. As a rule there is an increase of the volatile acids, and in some cases evidence of hypersecretion.

5. The evidence that the gastric symptoms are due to appendicular disease is threefold : (*a*) The majority of the patients are cured by appendicectomy ; (*b*) The influence which appendicectomy has on the gastric contents ; and (*c*) The frequency of a previous history of gastric symptoms in those who have an attack of acute appendicitis.

6. No operation for supposed gastric or duodenal ulcer is complete until an examination has been made of the appendix, small intestine, and mesenteric glands (that is, of the mid-gut).

7. If, in such an operation, no lesion can be found in the stomach or duodenum, it is not permissible to perform any operation such as gastro-enterostomy. This operation has results not surpassed by any other when performed in strictly appropriate cases. It is worse than useless in chronic appendicitis.

REFERENCES.—[1]*Brit. Med. Jour.* Jan. 29, 1910 ; [2]*Lancet*, Mar. 12, 1910 ; [3]*Ibid* ; [4]*Jour. Amer. Med. Assoc.* Mar. 19, 1910.

DYSPEPSIA, INTESTINAL. *Robt. Hutchison, M.D.*

Einhorn[1] divides cases of "intestinal dyspepsia" into (1) Those in which the digestion of all three foodstuffs—proteins, carbohydrates, and fats—is affected ("dyspepsia intestinalis universalis"); and (2) Those in which only one or two of these is involved ("dyspepsia intestinalis partialis"). He determines to which group any given case belongs by the use of his "bead test" (see *Annual*, 1909, p. 539). As regards classification by symptoms, he thinks the following remarks are justified :—"In the large group of disturbed starch-digestion, the subjective symptoms are relatively insignificant. They consist mainly in complaints of fullness in the abdomen, frequent eructations, and expulsions of wind. The condition of the stomach varies. It may be normal, or hyperchlorhydria, subacidity, or achylia may exist. The group of disturbed meat-digestion is characterized by the following syndrome : Nausea is usually present, and a bad taste exists in the mouth ; flatus are frequent and especially malodorant. The stool smells like decay. Patients may be well nourished, but they

suffer very much. Diarrhœa is not necessarily present. The class of disturbed fat-digestion is characterized by the occurrence of attacks of sometimes intense abdominal pains ; the stool is usually less consistent and of a lighter colour. At times, subjective symptoms are entirely absent. In the mixed groups, the clinical picture is still harder to define, because the various symptoms are less marked. In dyspepsia intestinalis universalis the clinical picture is rather severe : lack of appetite ; general debility ; usually, although not always, diarrhœa is present. Abdominal pain is frequent. Achylia gastrica is the rule in this class. In the majority of cases the condition is a mixed one.

Treatment. — In dyspepsia intestinalis universalis, **Fluid and Semi-fluid Diets** are indicated : milk, koumiss, raw and soft-boiled eggs, meat-powder, sanatogen, or similar preparations, soups, fine gruels, and leguminous vegetables in mashed form, crackers or zwieback, tea, cocoa, malt, and beer. As soon as the patient improves, the diet should be increased by adding fish, rice, mashed potatoes, and later white bread, scrambled eggs, and a small quantity of tender meats. In partial cases the ingredient which is badly digested should be reduced in quantity, but not banished from the diet altogether. General invigorating measures are of assistance, just as they are in gastric indigestion. Thus **Hydrotherapeutic** and **Electrotherapeutic** measures are of value. Climatic cures, life in the open air, freedom from care, will be of great assistance in accomplishing a considerable improvement or an entire restoration to health.

Thayer and Turck[2] deal very fully with intestinal *protein* indigestion, and attribute to it very varied symptoms, such as neurasthenia, headache, anæmia, diseases of the skin, albuminuria, melancholia, etc. In diagnosis they attach importance to the presence of (1) Indican in the urine, (2) Undigested muscle-fibres in the fæces. They submit the following provisional classification of cases :—(1) Neuralgic ; with frequent frontal headaches ; there may be other neuralgias or actual neuritis ; usually the nerves above the waist are chiefly or alone affected ; these cases commonly have more indolacetic acid than indican in the urine. (2) Neurasthenic ; when in males, there is often present a distinctly sexual element, with seminal vesiculitis or prostatitis. (3) Anæmic-chlorotic ; often found in young women who neglect their bowels and eat imprudently. (4) Dyspeptic with flatulence, alternating diarrhœa and constipation, distress or dull pain in abdomen, ptosis of some of the viscera, chronic appendicitis. (5) Mental ; with fears, dullness, rapid exhaustion on mental effort, impaired will and memory, melancholy. (6) Mixed types, most common, but one of the above usually predominating.

Treatment naturally falls into two main divisions, the dietetic and the medicinal. The most valuable hints for **Diet** are derived from the study of the fæces and the tests of hepatic and pancreatic efficiency ; for if the patient is making a good use of starches and sugars, while fats are fairly well digested, the indications are clearly to cut proteins to a minimum, make cereals and other starches the main reliance,

and supply assimilable fats guardedly. It will not do to exclude proteins from the diet entirely, for these patients are often losing weight, and without proteins in the food, they will consume the body's own proteins and lose weight. A little lean meat once a day, or milk or vegetables rich in protein, may be allowed. Gelatin is very useful in such cases, and so also are butter-milk or fermented milk. Tea, coffee, and alcohol should be forbidden.

The indications for drugs are chiefly six: (1) To clean the bowel thoroughly; (2) To stimulate the liver to produce more bile and of a more fluid quality; (3) To supply ferments; (4) To disinfect the alimentary canal; (5) To care for the stomach condition; (6) Tonics. The first and second of these indications are met by the use of **Calomel, Podophyllin,** and **Phenolphthalein.** The use of **Ferments** should be kept up for several months. For disinfection of the alimentary canal they believe in **Sulphocarbolates.** Any derangement of the gastric secretion must be corrected, and tonics, especially **Iron** and **Arsenic,** be given when necessary, particularly at the beginning of treatment.

REFERENCES.—[1]*Med. Rec.* Sept. 4, 1909; [2]*Ibid.* Mar. 26, 1910.

EAR, DISEASES OF THE.

W. Milligan, M.D.
D. Lindley Sewell, M.B.

Removal of Foreign Bodies.—In a paper on "Useful Points in Connection with Diseases of the Ear," Yearsley[1] advises against unskilful syringing in the removal of ceruminous plugs: frequently the plug is only forced further into the canal. The stream should be directed above or to one side of the mass, so that the lotion may pass to one side of the plug and wash it out from behind; preliminary loosening with a probe will greatly help. To soften the plug immediately, instil cold **Peroxide of Hydrogen** for twenty minutes, or instil five or six drops of **Ether** for about one minute, and then syringe; the latter method will cause pain should the ether reach the tympanic membrane.

In the removal of foreign bodies from the ear, reliance should be placed upon syringing unless it causes vertigo, or the body is sharp-pointed and likely to injure the tympanic membrane, or is of such a nature as to quickly absorb water (peas, beans, bread, wool, sponge, etc.).

Aural Furunculosis.—When, in cases of furunculosis of the external auditory meatus, incision of the boil is refused by the patient, or not deemed necessary by the surgeon, Bruch[2] recommends tampons of wool soaked in **Ichthyol** and **Glycerin,** equal parts of each, passed into the meatus. The tampon should not be inserted too tightly, and should be changed twice daily. This method is pain-relieving and useful in preventing a recurrence of boils, if kept up for a few days after the acute trouble has subsided. Boils in the meatus may cause such prominence of the pinna and surrounding redness and œdema as to simulate a mastoiditis. A very useful point of differentiation is that in the latter the retro-auricular furrow is never obliterated; in the former, always.

Membrana Tympani.—Steinochneider[3] publishes some interesting results of a research into the permeability and absorptive capacity of the tympanic membrane and external auditory meatus. It is a matter of some importance, since the practice of instilling drops into the meatus is so common, more particularly for the purpose of producing anæsthesia of the tympanic membrane for the operation of paracentesis. A 10 per cent potassium iodide lotion was instilled for three hours into the auditory canal of a woman with normal ears, with a result that a careful examination of the urine failed to show the presence of any iodine. Repeated trials on the same and different individuals failed to prove any absorption of the solution. The potassium iodide solution was allowed to remain fifteen minutes in the auditory canal of a dead man, the tegmen tympani was removed, and the cavity of the middle ear completely washed out with distilled water and dried with cotton-wool ; the testing of this lotion for iodine yielded a negative result. A series of experiments was carried out on animals, in which various substances were placed in the auditory canal for various lengths of time ; the animal was then killed, and the middle ear and its adnexa were examined microscopically. It was found, using a carmine lotion, that penetration had certainly taken place to the mucous membrane layer of the tympanic membrane, and thence over the cavity of the middle ear ; the previous use of cocaine-carbolic lotion, very commonly employed as a local anæsthetic, increased the permeability of the tympanic membrane. It would seem then that the addition of carbolic acid to the anæsthetic lotions for the ear was correct ; moreover, the usual belief among aurists that nothing can be absorbed through the intact membrane, is not altogether justified.

Otosclerosis.—Fröschels[4] records a new symptom which he has observed in cases of otosclerosis. The fact that subjects of otosclerosis were able to stand light manipulations in the external ear better than other people, led to a systematic testing of the sensibility of the auditory canal in a large number of cases. A small piece of cotton-wool rolled on a wool-carrier was introduced half an inch into the canal, the carrier being lightly held between the thumb and fore-finger. The postero-superior part of the canal was then lightly touched three or four times with a to-and-fro movement, the expression of the patient being observed meanwhile. In cases of otosclerosis the patients were very tolerant, but more so on the side on which the disease was more advanced. In cases of advanced catarrhal changes in the middle ear, the writer considers that a diagnosis of concomitant otosclerosis is justified, if this symptom is present. The matter needs further investigation.

In a short paper Sewell[5] reviews the modern conceptions of otosclerosis. This is a name given to a group of cases in which, with patent Eustachian tubes and normal or nearly normal tympanic membranes, there occurs a progressive deafness with definite characteristics on functional testing, the anatomico-pathological basis of the disease consisting in a bony ankylosis of the stapes in the oval window and in certain

changes leading to rarefying osteitis of the labyrinthine capsule. In a typical specimen, the stapes will be seen to be fixed to the oval window by bony processes. This formation of new bone leading to ankylosis of the stapes is simply the result of a change which has taken place in the bony capsule of the labyrinth and involved the stapedial joint. As to the pathogenesis of the condition, Gray advances the ingenious view that under certain conditions (anæmia, pregnancy, syphilis, gout), thrombosis occurs in the small vessels of the part. As a result, the portion of bone losing its blood-supply dies and undergoes absorption, with the coincident laying down of new-formed bone. Otosclerosis is mainly a disease of early life, usually occurring between the twentieth and thirtieth years, and attacks women more frequently than men. Hereditary influences probably play a strong part in the etiology of the condition; it is frequently associated with some menstrual anomaly, and pregnancy and parturition have an undoubted influence on the course of the disease. Syphilis, gout, and rheumatism are frequently quoted as causal agents, but in the writer's opinion on quite insufficient evidence. The two main symptoms are deafness and tinnitus; the former is slowly progressive and finally bilateral. A very common symptom is the ability to hear better in a noise. On examining a pure case of otosclerosis, one finds a normal tympanic membrane and a free Eustachian tube. Sometimes a tympanic membrane is seen showing a flamingo-red tinge just behind the handle of the malleus over the region of the promontory. This is ascribed to an over-filled condition of the blood-vessels in this part. Functional testing with tuning-forks will in typical cases show the presence of what is known as Bezold's triad of symptoms, i.e., (1) Prolongation of bone-conduction; (2) A markedly negative Rinné's test; (3) A loss of hearing for the low tones of the scale. As would be expected from a study of the pathological anatomy of otosclerosis, there is no line of treatment which will cure the condition when well established. No drug has yet been discovered which will absorb the bone fixing the stapes and so allow of free movement at the oval window. The most that can be hoped for is to arrest or retard the progress of the disease, and the writer, with this end in view, has much more faith in measures directed to bringing about good general health than in the prolonged use of any one drug with a reputed specific action.

Pregnancy and parturition have undoubtedly an unfavourable influence on the disease, and this fact should be pointed out to patients.

Of the many drugs used for this condition, **Potassium Iodide** and **Phosphorus** are the only two worth trying; the latter may be given in an oily solution ($\frac{1}{10}$ per cent) in doses of 10 min., three times a day after food, the dose being gradually increased up to 40 min. Potassium iodide should be given in 15-gr. doses in plenty of water after meals, and it is advisable to give the drug for two or three weeks, with remissions of two months, four or five times a year.

Local treatment is generally regarded as harmful, but pneumo-massage may prove of benefit in early cases. The machine employed

should give a short piston-stroke (2 mm.), but be of high velocity. Such surgical operations as have been attempted for the condition have been so disappointing as to discourage further experiments in this direction. The use of **Iron** and **Arsenic** is indicated in any cases with anæmic manifestations. For the relief of the distressing tinnitus, a free action of the bowels should be obtained by regular use of saline waters; in many cases resort must be had to the various **Bromides**: a useful combination consists of 5 gr. each of ammonium bromide and potassium iodide after meals.

Otitis.—Young[1] says that in children the commonest predisposing cause of acute otitis is the presence of adenoids, and the question arises, Should the latter be removed during the acute attack? Yearsley strongly advises against this practice, since at the time the nasal and nasopharyngeal mucous membrane is acutely inflamed, and likewise the adenoid mass, and to remove it is to risk a serious toxæmia.

The pain of slight congestive aching in otitis may be relieved by inclining the ear over an egg-cup containing a few drops of chloroform. A better means is afforded by applying two to six leeches over the mastoid area, with one just in front of the tragus. As soon as a drum-head bulges it should be incised.

Otitis Media Suppurativa.—W. Stuart Low[6] describes a method of employing certain **Antiseptic Vapours** in the treatment of aural sepsis. The two chief causes of chronic suppurative otitis media are the presence of enlarged tonsils and adenoids, and the frequency with which an acute otitis media is allowed to run its course; enlarged tonsils and adenoids maintain an aural discharge by repeated infection of the middle-ear tract. The writer strongly disapproves of syringing the ear with various lotions, for he holds that in this way the sepsis may be driven farther afield and lead to infection of attic, aditus, and antrum or mastoid cells. The substance employed for the generation of the vapour is **Kelvolin,** a dark-coloured liquid containing 40 per cent phenol-homologues and 35 per cent refined neutral products from coal tar; it is a powerful germicide, non-irritating to the tissues, and easily volatilized. Kelvolin is used in a "volatilizing-inflator," which consists of a metal cylinder containing a spirit lamp below and a small boiler above, from which two bulbed-glass tubes lead, and to one of these the inflating bag is attached. Before lighting the lamp, two drachms of kelvolin are poured into the boiler, and the second glass tube is connected with the external auditory meatus. The vapour is then freely driven into the external auditory meatus, thence into the middle ear and antrum, and downwards into the Eustachian tube; by means of a catheter it may also be injected through the Eustachian tube. Before using the vapour in the way described, the ear should be freed from all discharge; this is best accomplished by careful mopping, aerial inflation through the Eustachian catheter, and suction with a Siegle's speculum. The only precautions necessary are to observe that the kelvolin is put in before the lamp is lighted, that the boiler is never allowed to get too hot, and that inflation should be begun as

soon as the lamp is lighted. The method should be employed twice or three times weekly.

Barr and Rowan[7] publish a second paper on their researches into the relationship between optic neuritis and suppurative otitis media, and as a result of their further experience conclude: (1) Optic neuritis may occur in cases of purulent middle-ear disease without obvious signs of an intracranial complication (eleven times in 160 cases, or 6·8 per cent); (2) Apart from optic neuritis, vascular changes of a less degree are frequent (thirty-nine times in 160 cases, or about 25 per cent); (3) Cases of purulent middle-ear disease in which optic neuritis or vascular engorgement of the fundus is present are much less amenable to local treatment than those in which the fundus is normal; (4) As a general rule, an improvement in the eye condition is accompanied by improvement in the aural condition, while an increase in the intensity of the changes in the fundus or their persistence is associated with less amenability to treatment, and greater gravity of the ear condition; (5) The most probable cause of vascular engorgement of the fundus or optic neuritis is serous meningitis (diffuse or localized); (6) Optic neuritis caused in this way is not usually followed by atrophy, and unless there are other symptoms demanding it, opening of the dura is unnecessary;

The practical lessons deducible from these observations are: (1) That a case showing these changes in the fundus should be closely watched, and their existence regarded as an additional reason for the early performance of the radical mastoid operation; (2) If, on the other hand, they show a tendency to clear off, especially with improvement in the ear condition, or if the fundus is normal to begin with and remains so, we may with more confidence look for a favourable response to conservative treatment.

Diseases of the Mastoid Process.—Reik[8] points out that nowadays, in every operation for mastoiditis, the surgeon endeavours to remove every particle of pus, detritus, and necrotic bone, and then usually treats the mastoidectomy wound as a pus cavity which should be compelled to fill up by granulations from the bottom—a process requiring repeated dressings and a prolonged period of time. As an improvement he strongly recommends the "blood-clot dressing," with primary union of the wound. Experimental and clinical studies have shown that if any clean wound be filled with the patient's own blood and safeguarded from later infection, the blood-clot tends to organize, the fibrinous framework of the clot constituting a scaffolding on which the new tissue is built. Fresh granulations spring from the walls of the cavity and grow into the clot, forming a new fibrous connective tissue; later, osteoblasts are sent out from the bone or periosteum, and the fibrous tissue is converted into bone. Fresh human blood has certain bactericidal properties varying in degree to different organisms, and this property tends to diminish after forty-eight hours. The antibacterial substance is secreted by the leucocytes, and is generally supposed to be nuclein. It is more potent when the alkalinity

of the blood is raised, and should this be lowered or rendered acid, such power is much diminished. Alcohol and perchloride of mercury have a deleterious effect on the bactericidal properties of blood-serum.

The success of the method depends upon the most careful technique with regard to the elimination of sepsis. The area around the ear on the affected side should be shaved the night before operation, scrubbed with soft soap and water, and the surface then mopped with a saturated solution of potassium permanganate, the stain thus produced being removed with a saturated solution of oxalic acid. This is followed by a thorough rinsing with a solution of mercuric chloride (1–2000), and then a pad of bichloride of mercury gauze is laid over the part. At the time of operation, towels are so arranged on a special frame that the anæsthetist is quite cut off from the operating-field. Any instrument which has been used during the operation is washed in carbolic lotion, and then in sterile water, before being used again. The operator prepares his hands in a similar way to that in which the skin of the patient was made clean, and wears rubber gloves and sterile cap and gauze mask. Every effort to eradicate small foci of disease is made, and then the wound is flushed with hot normal salt solution ; finally, having dried out the salt solution, the wound cavity is permitted to fill with blood, and the edges of the incision are brought together by a subcutaneous suture of silver wire. The superficial dressing should be removed in five days, and the suture withdrawn. The author has been able to secure primary union in 90 per cent of his cases.

Latent Mastoiditis.—A case of streptococcal infection of the middle ear, with normal membrane and perfect hearing, is described by Sydney Scott.[9] It occurred in a little girl who had had slight headache and pain behind the ear for about three weeks. She had never had discharge from the ear, and, according to her mother, had had scarlet fever three months previously. There was a small and tender swelling over the right mastoid, and the auricle was a very little displaced. The tympanic membrane was perfectly normal in all respects ; in the left nasal passage was a greyish-white membranous exudate adherent to the septum. A clinical diagnosis of infective mastoiditis and membranous rhinorrhœa was made, and the latter proved by bacteriological examination. The child was submitted to operation, when it was found that there was extensive disease involving the whole of the mastoid region down to the apex, and also a considerable extradural abscess in the posterior fossa. From the pus a pure growth of streptococcus was obtained which gave Gordon's differential tests for pyogenes. A note from the fever hospital where the child had been sent gave the information that she had probably not had scarlet fever, but merely tonsillitis, and that while convalescing from this throat infection she had ear-ache for one day only.

The chain of evidence in this and allied cases of latent mastoiditis would go to show that what was regarded as "primary mastoiditis" by earlier writers was, in all probability, latent mastoiditis secondary to an infection which gained access from the naso-pharynx through

the Eustachian tube and tympanic cavity. It is certain that the symptoms accompanying this migration of microbes may be very slight, and judging from analogy with the behaviour of tissues in other parts of the body, there is no doubt that organisms may lie latent for long periods in accessory cells in the mastoid process before their presence becomes manifest. The case is of interest in that it shows that the tubercle bacillus is not the only cause of latent mastoiditis, and that from the presence of a normal tympanic membrane we should not always preclude the existence of an infection in some part of the middle-ear tract.

The following indications are given by Young[1] for operating in cases of acute mastoiditis: (1) Mastoid swelling, with tenderness on pressure, and fever; (2) Persistent tenderness, even after the subsidence of acute symptoms; (3) Bulging of the postero-superior meatal wall; (4) Continuance of discharge, mastoid pain, and fever, after abortive treatment has been attempted; (5) The occurrence of chills, nausea, and meningeal irritation; (6) The presence of streptococci in the pus; (7) When a simple blood-count demonstrates the presence of leucocytosis, and the polymorphonuclear percentage is above normal.

Cholesteatoma.—Two cases are reported by White,[10] in which, at the time of performing the radical mastoid operation, the matrix of a cholesteatoma was left undisturbed in order that its epidermis might serve in covering the bony cavity. It is a method originally suggested by Siebenmann, who, as a result of extended histological research, concluded that the matrix of a cholesteatoma was not a pathological epithelial growth, but was a natural attempt at repair, and that the destruction of bone which usually occurs is from pressure due to retention. If the spaces of the middle ear and adnexa are freely exposed by the radical operation without disturbing the cholesteatomatous matrix, the epithelium of the latter quickly assumes a normal character, and it is claimed that epidermization of the antro-tympanic cavity is often complete in three or four weeks.

Tinnitus Aurium.—In discussing the non-operative treatment of tinnitus aurium, Barr[11] first of all emphasizes the importance of attention to the general health and habits of the patient. Frequently the presence of albuminuria, glycosuria, or some heart lesion will give a guide to appropriate treatment. If the digestive or hepatic system is at fault, a gouty or rheumatic tendency is induced, giving rise to vasomotor disturbances in the labyrinth; in such cases **Alkalies** and **Saline aperients,** or a course of alkali-saline waters, such as Carlsbad, with an occasional mercurial, in addition to regulated diet and habits, will be indicated.

In many cases a neurasthenic condition is present, the result of nerve exhaustion or depression. Then **Rest,** with change of air and surroundings, supplemented by tonics such as **Glycerophosphates, Strychnine,** or **Arsenic** if necessary. Anæmia is often associated with tinnitus, especially in the form due to otosclerosis in adolescents—this should be dealt with by means of **Iron, Arsenic,** nourishing food, and open-air

exercise. In the pulsating forms of tinnitus, **Digitalis** sometimes exercises a good effect. The writer has been disappointed in the later remedies, fibrolysin and thiosinamine; the prolonged use of phosphorus has also been of little benefit. Of all drugs, the most serviceable are the various **Bromide salts,** which have seemed to be more effective than hydrobromic acid; their long-continued employment is undesirable, but a large dose at bed-time is very useful in cases in which the tinnitus prevents sleep.

In the forms of tinnitus associated with vertigo, either with or without evidence of a syphilitic cause, **Iodide of Potassium** in large doses, and **Iodine Yasogen** rubbed in behind the ear, are at times of service. In acute labyrinthitis, **Pilocarpine,** probably by its action in stimulating the absorption of effused products before their organization, is very useful, but must be employed early. A dry, bracing, inland, upland air is more beneficial than the humid air of the seaside, which frequently seems to aggravate the tinnitus. **Pneumo-massage** which is extensively used at the present time, is not recommended by all authorities, some believing that it makes matters worse. At present it is not possible to form a definite opinion as to its value.

Lucae found that a striking influence is frequently exerted upon certain subjective sounds in the ear, mainly of a musical character, by bringing to bear upon them objective sounds coming from a tuning-fork, if these objective sounds be as far removed as possible in pitch from the subjective ones. This is called the "**Ton-behandlung Treatment.**" If the sounds in the ear are high-pitched, a deep-toned tuning-fork (C or C_1) is employed; if the tinnitus is low-pitched, then a tuning-fork such as C^3 or C^4 is used. The vibrating fork is applied either by placing the end of its handle in the external meatus, or the vibrations are passed in through a resonator; the duration of the application lasts from one to five minutes. The writer has experienced no lasting results from this method. Tinnitus may be of dental origin, when attention must be paid to the teeth.

Lake, in discussing the **Operative treatment** of tinnitus, stated that of the intranasal operations which are done for the relief of this condition, two only are of any use. One is the removal of the enlarged posterior end of the inferior turbinate, and the other the removal of serious spurs, i.e., spurs of the vomer which touch, or are adherent to, the outer nasal wall. Tinnitus occurring reflexly from intranasal conditions is rare, but is frequently overlooked.

The writer has not felt justified in performing lumbar puncture for the relief of tinnitus, a procedure which is strongly advocated by Babinski, who records cures in thirty out of ninety cases. Lake is of opinion that any benefit which may accrue is due indirectly to the effect on the blood-pressure (reducing its tension), since the endolymphatic and perilymphatic spaces are not in direct communication with the subarachnoid space.

Division of the tensor tympani tendon and section of the posterior fold of the tympanic membrane, although once frequently performed,

are now falling into disuse. In certain cases when the stapes is still mobile, removal of the malleus, of the incus, or of both these bones, has done good, but such a measure is to be regarded as a preliminary operation with a possibility of staving off one of greater magnitude. The removal of the stapes is not advisable.

Of the methods which depend on experimental opening of the labyrinth, we have:—Entrance through the oval window; perforation of an ankylosed foot-plate; entrance by way of the round window; and trephining the cochlea. They depend for success upon the presence of an excess of intralabyrinthine fluid, a condition which does not always occur. Tying the internal carotid is quite indefensible, seeing that it is impossible by so doing to carry out the underlying idea of the operation, which is to cut off the blood-supply to the ear.

The operation of total ablation of the cochlea would appear to be the most logical step, in that it attacks and destroys the whole of the cochlear division of the eighth nerve—that is, the auditory part. A preliminary radical operation is performed, with a wide removal of bone, to allow a full view of the deep parts, especially the inner wall of the middle ear. The promontory is cut away with a chisel or curved gouge, and the whole of the roof of the cochlea removed; the modiolus is then seen as a tiny projection, and is cut off with a sharp tap of the mallet, using a narrow chisel. Cerebrospinal fluid now flows freely, but a small plug of sterilized wax will immediately plug the orifice through which it escapes. As regards the operation of dividing the auditory nerve, the author is of opinion that it ought never to be performed.

For use of Electro-therapy in Tinnitus, see *p.* 93.

Suppuration of the Labyrinth.—Sewell[12] reports a case of chronic suppurative otitis media with labyrinthine fistula and spontaneous nystagmus. The patient was a child aged six, who, in addition to other signs showed marked spontaneous nystagmus to the left, i.e., away from the side of the lesion, the right ear being the one affected with otitis. Syringing with cold water increased the intensity of the nystagmus, and compressing the air in the meatus by means of a small Politzer's bag produced a nystagmus directed to the right side; by rarefaction no apparent increase in the left nystagmus was produced. An extensive mastoid exenteration was performed, when a large part of the temporal bone was found to be destroyed, hollowed out, and filled with a foul-smelling cholesteatoma. A tiny fistula, which was not curetted or enlarged, was seen leading into the external canal. The patient made a speedy and uninterrupted recovery.

The case is of interest in so far as it illustrates the practical value of **Bárány's Vestibular Tests** as an aid to diagnosis. The active response to the caloric test (syringing with cold water) showed that the vestibular apparatus was still functional, an important point to determine, since in early cases of labyrinthitis the nystagmus is generally directed to the diseased side, and only changes its direction to the sound side as the vestibular apparatus becomes more and more destroyed. In this case the nystagmus was directed away from the diseased side. The active

response to the " pressure test " pointed to a breach in the labyrinthine wall, and this fact, combined with that of a vestibular apparatus still functional, led to the diagnosis of " circumscribed labyrinthitis." With regard to the treatment of such a condition, it is good practice to be content with a wide radical mastoid operation, and then to keep the case under careful observation, and only to interfere with the labyrinth if improvement does not ensue.

Harper[13] briefly discusses the value of Bárány's vestibular tests in differentiating between acute labyrinthitis and cerebellar abscess, a diagnosis which is at times difficult, for in both conditions there occur disturbance of equilibrium, giddiness, and nystagmus. Suppose a patient, who has been suffering from chronic suppurative otitis media in the right ear for some time, suddenly taken ill, and showing the above-mentioned symptoms, and that the nystagmus is directed to the right side. The patient is probably confined to bed, and therefore rotatory tests cannot be performed. Resort must be had to the caloric test. With the patient lying on his back, sterilized water at 21° C. is allowed to flow in through the external meatus. If, after a lapse of from twelve to sixty seconds, we do not get a nystagmus to the left, or find that the spontaneous nystagmus to the right is not lessened, this nystagmus to the right must be due to some intracranial condition. The absence of the right caloric reaction shows that the right canals must be already destroyed, or at least that their function is lost, and that they are no longer capable of sending impulses ; and, again, if all this spontaneous nystagmus were due to the destruction of the right canals, it would be to the left and not to the right, and not due to any labyrinthine condition. Should, however, the patient, with the diseased ear on the right side, have nystagmus to the left, we again apply the caloric test, now using water at a temperature of 39° C., since we wish if possible to create a nystagmus to the right. If we find the function of the labyrinth remains, even though impaired, we must diagnose suppuration of the labyrinth, and not cerebellar abscess ; but should this spontaneous nystagmus not become less after four or five days, we must diagnose cerebellar abscess in addition. As a general rule, it may be stated that should the patient have strong rotatory nystagmus to the right or to the left ; and if on application of the caloric test the right canals are found to be capable of being irritated ; and if this nystagmus does not become less as time goes on, then it is evident that the cause must be intracranial.

Deafness.—In the treatment of deafness from non-suppurative causes the upper air passages, Young[1] says, must never be neglected, and the practice of auto-inflation should never be advised. Such patients, who at first find benefit from it, practise it so frequently that ultimately the drum-heads are stretched and rendered too lax, and the deafness much increased. In the majority of cases inflation should be carried out with a catheter, for by this method the force of inflation is under control, one ear is treated at a time, and intratympanic injections can be made. The catheter should be used frequently ; in most cases once

a week is quite useless: it should be used every day, or every other day for a fortnight, and then less frequently for a variable time according to the case.

In the differential diagnosis between deafness due to disease of the conducting mechanism and that arising from disease of the perceptive apparatus, the latter is indicated when (1) Bone conduction is diminished by more than ten seconds; (2) High-pitched sounds are badly heard; (3) Hearing is worse in a noise; and (4) Spoken speech is heard relatively better than the Politzer akoumeter. On the other hand, obstructive deafness is suggested by: (1) Loss of air conduction, and Rinné's reaction negative; (2) Bone-conduction increased; (3) High-pitched sounds heard better than those of low pitch; (4) Hearing better in a noise; and (5) The akoumeter heard better than spoken speech.

Deaf Mutism—Pathology.—A. A. Gray[14] records his findings at the post-mortem examination of the temporal bones of four cases of deaf-mutism. Other observers have also published their investigations, and briefly it may be stated that an actual arrest of development of the whole organ of hearing has been found, the outer, middle and internal ear being affected. Such cases are very rare; in a larger percentage the middle ear has been found altered either in respect to mal-development or as a result of suppurative processes; but in by far the larger number of cases the inner ear alone has suffered or been the seat of the most pronounced changes. The changes most often found were atrophy and degeneration of the organ of Corti and of the nerve fibres supplying it, and of the cells of the spiral ganglion. The nerve fibres supplying the vestibule and ampullæ of the canals were sometimes degenerated, sometimes not; a common feature was depression of the membrane of Reissner so that it came to lie near, or in contact with, the organ of Corti.

In the case examined by Gray, no serious defects were found in either the outer or the middle ears, and this condition is probably the most common in deaf-mutes. The muscular fibres of the tensor tympani presented a normal healthy appearance, probably due to the fact that a certain amount of hearing power had been retained, so that the normal stimulation to contract on the perception of sound was present, and accordingly the muscular fibres would be saved from atrophy from disuse. The salient features of the changes in the inner ear were: The disorganized condition of the organ of Corti, the depression of the membrane of Reissner, a curious development of the stria vascularis in the upper portions of the cochlea, and the degeneration of the nerve elements in the spinal ganglion and the cochlear portion of the auditory nerve. The remarkable development of the stria vascularis deserves further mention; its presence, although difficult to explain, certainly indicates something more than repair after inflammatory activity in post-natal life; it may indeed be an indication of repair occurring during fœtal life, when the tissues are capable of a repair more complete in respect to the differentiation

of cellular elements. The writer carefully measured the labyrinth and found that it was considerably larger than normal; *à priori*, one would have expected that an organ whose function had been entirely or almost entirely abrogated for years would have been of the infantile type, or smaller than normal. A probable explanation of this condition is to be found in the occurrence of increased intra-labyrinthine pressure during fœtal or very early post-natal life. At this period the labyrinth is surrounded by a layer of cartilage which could yield to pressure in a way impossible in the case of the rigid bony walls of later life.

Otitic Meningitis.—In considering the present-day treatment of otitic meningitis, Dench[15] distinguishes: (1) Cases in which only a limited area of dura is involved, i.e., extradural abscess. (2) Those in which a general meningitis is present, which may again be divided into (*a*) Those in which a serous meningitis involves principally the subdural space; (*b*) Those in which a serous meningitis involves both the subdural space and the lateral ventricles. (3) Cases of purulent meningitis involving only a localized portion of the subdural space. (4) Cases of purulent meningitis involving the subdural space and the lateral ventricles. Out of 101 cases of otitic meningitis collected from literature, 45 were cured by operation and 56 died. An analysis of the cases shows that the prognosis was more favourable the more localized the lesion and the earlier the operation.

The first step in the operative procedure is a thorough removal of the local site of infection, either by a complete mastoid operation in meningitis following an acute otitis media, or by the radical mastoid operation in cases following a chronic otitis. Should a collection of pus be found between the dura and the bone overlying the infected dura, it is necessary to remove the bone completely; but the removal must not extend beyond the limits of the extradural abscess. In curetting granulations, great care should be exercised to avoid breaking through into the subdural space.

It has been proved by numerous post-mortem examinations that the most usual route of extension from the middle ear to the meninges is through the labyrinth. Careful examination should therefore always be made for fistulæ in the outer labyrinthine wall, and if one is found, drainage should be attempted by a thorough opening up of the labyrinth. Lumbar puncture should always be performed, and from 20 to 40 cc. of fluid withdrawn; this operation should be repeated whenever there is evidence of increased intracranial tension.

When the meningeal symptoms are exceedingly severe, it is wise at the time of the primary operation to relieve the intracranial pressure by the "decompression operation," which is performed as follows: The squama is exposed by an incision extending from the upper extremity of the ordinary one made in exposing the mastoid, upward, and then forward and downward to a point just behind the external angular process of the frontal bone. This incision extends through the

skin, the temporal fascia, and the temporal muscle. The musculocutaneous flap is then pushed downward, and the middle cranial fossa entered just above the zygoma by means of a gouge. The opening in the cranial cavity is rapidly enlarged forward, upward, and backward, by means of rongeur forceps, so as to expose the temporosphenoidal lobe over an area of at least three inches in longitudinal measurement, and two inches in vertical. The base of the temporosphenoidal lobe should also be exposed by extending the opening in the squama downward and backward, to remove the roof of the middle ear and of the mastoid antrum. The dura is then opened by two crossed incisions about 1½ inches long. By a similar procedure decompression over the cerebellar area may also be performed.

Drainage of the lateral ventricles may also be indicated to relieve intracranial pressure, and is best performed, after incising the brain substance, by passing in two thin-bladed retractors and gradually separating them to allow the fluid to escape; a folded rubber-tissue drain should then be inserted between the retractors and allowed to remain in situ. The lateral ventricles should not as a rule be opened when the decompression operation is performed, but twenty-four hours should be allowed to elapse in order to ascertain whether this in itself has not relieved the pressure.

In certain cases of meningitis of sudden onset, the writer is of opinion that as the aqueductus vestibuli and aqueductus cochleæ both open into the subdural space on the posterior surface of the petrous bone, good would result from incising the dura mater just in front of the lateral sinus although, if the sinus happens to lie far forwards, the space available is rather limited.

Wittmaack[16] describes two cases of suppurative meningitis secondary to otitis media in which cure followed operation. He was fortunate enough to meet the cases at an early stage. The diagnosis was established by clinical symptoms, and by examination of the cerebrospinal fluid withdrawn by lumbar puncture; in both cases it was opaque, and in one contained numerous diplococci. The operation consisted in a preliminary wide and extensive radical mastoid operation, followed by opening of the posterior portion of the labyrinth by Neumann's method, the petrous bone being removed up to the level of the internal auditory meatus. The dura was farther exposed from this point up to the lateral sinus, and then freely incised; sterile gauze was loosely packed in through this opening. In the second case, in addition to this procedure, the dura mater in the temporo-sphenoidal region was similarly treated and drained. The writer, while admitting that lumbar puncture may occasionally be misleading, thinks that in the majority of cases it is of the greatest value as a diagnostic aid, and that an opaque fluid is a strong indication for immediate operative interference. The only hope of success in cases of meningitis lies in early diagnosis and early drainage.

Logan Turner[17] describes two cases of meningitis complicating chronic middle-ear suppuration in which recovery took place. The

treatment consisted in a thorough removal of the primary focus of suppuration in the middle ear and mastoid antrum and cells, followed by repeated lumbar puncture. In one case antistreptococcic serum (10 cc.) was injected subcutaneously, and also into the spinal canal (5 cc. on one occasion, and 10 cc. on others, three injections in all being made). Success in the two cases was thought to be due mainly to the fact that treatment was undertaken at a very early stage of the inflammation.

REFERENCES.—[1]*Pract.* Oct. 1909; [2]*Münch. med. Woch.* Dec. 14, 1909; [3]*Monats. f. Ohrenheilk.* 1910, vol. iv.; [4]*Ibid.* 1910, vol. i.; [5]*Pract.* Feb., 1910; [6]*Ibid.* Ap. 1910; [7]*Brit. Med. Jour.* Mar. 26, 1910; [8]*Johns Hop. Hosp. Bull.* Ap. 1910; [9]*Pract.* Jan. 1910; [10]*Montr. Med. Jour.* Dec. 1909; [11]*Brit. Med. Jour.* Oct. 16, 1909; [12]*Lancet*, Jan. 1, 1910; [13]*Ibid.* May 7, 1910; [14]*Jour. Laryngol.* May, 1910; [15]*Amer. Jour. Med. Sci.* Feb. 1910; [16]*Münch. med. Woch.* Nov. 24, 1909; [17]*Edin. Med. Jour.* Feb. 1910.

ECZEMA. *E. Graham Little, M.D., F.R.C.P.*

Abt[1] insists upon the importance of constitutional causes, especially overfeeding, in eczema in infants, quoting many authorities, but curiously omitting Arthur Hall's valuable statistical enquiry, which showed that eczematous infants are usually fat and overfed. Inhibition of metabolism, shown by an increase of the nitrogen extractive and chlorides, and diminution in uric acid, is maintained by Gaucher to be a constant feature of all forms of eczema. Local treatment consists in removal of the crusts and the application of a paste, e.g. :—

℞	Zinci Oxidi	ʒvij	Liq. Calcis	℥j
	Adip. Lanæ Hydr.	ʒj	Ol. Amygdal. Express.	ʒj

In milder cases a powder, such as the following, may be used :—

℞	Zinci Oxidi	30 per cent	Talc.	70 per cent

To prevent scratching, the arms should be put in light cardboard splints. When moisture is no longer present, an ointment consisting of zinc oxide and olive oil, equal parts, is often useful.

Dietetic Treatment, says Abt, is usually sufficient to cure a beginning eczema, and to prevent the occurrence of complications. Restriction of diet is often required, such as substitution of skimmed milk, buttermilk, or whey, for milk, with the inclusion of cereals, and the exclusion of eggs, meat, and broths. **Thyroid Extract** will sometimes do wonders.

Davis[2] is again a witness to the efficacy of **Staphylococcic Injections** in acute eczema. A boy, aged sixteen, with very extensive eczema, was treated as follows: Sept. 15, 100 million staphylococcic vaccine; Sept. 18, 100 million; Sept. 22, 250 million; Sept. 25, 500 million; Sept. 27, 500 million; Sept. 29, 750 million; Oct. 2, 1000 million; Oct. 9, 1000 million; Oct. 23, 750 million. I give these full details, as they are interesting, and the injections certainly unusually large and frequent. The result was excellent.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Sept. 11, 1909; [2]*Lancet*, Nov. 6, 1909.

ECZEMA MARGINATUM. *E. Graham Little, M.D., F.R.C.P*

This, which was Hebra's designation for a disease simulating eczema, occurring in the groin, and demonstrated by Kaposi and others to be a mycotic infection ascribed to a trichophyton, has been shown by Sabouraud[1] to be due, not to a trichophyton, but to a special organism, which he has named *Epidermophyton inguinale*, and which he describes in detail. The disease, which usually begins in the groin, may be transferred to the fingers and toes, producing in these latter a vesicular eruption easily confounded with dysidrosis; in this form the appearances are exactly those of eczema. The identification of the mycelial threads is easily made by boiling the scales removed for examination in 40 per cent potash; when the epidermis is much thickened, soaking in potash for one or two hours may be necessary to reveal the mycelium, which has a special type of fructification distinguishing it from all other dermatophytes. The best method of treatment is to apply 1 to 3 per cent **Chrysophanic Acid Ointment.** The cure is much more obstinate than with trichophyton.

REFERENCE.—[1]*Ann. de Derm. et de Syph.* June, 1910, p. 289.

EMPHYSEMA.

Iothion in (*page* 33).

EPIDERMIDOLYSIS BULLOSA CONGENITA.

E. Graham Little, M.D., F.R.C.P.

Sutton[1] reports clinical and histological features of a case of this rare disease, the title of which he alters as above. The patient was a female child, aged three, who some two days after birth had suffered from bullæ, watery and hæmorrhagic, apparently appearing sometimes spontaneously, more often in response to quite trivial injury. The finger- and toe-nails had disappeared. Numerous areas of cicatricial baldness were present on the scalp. She was never free from bullæ, which could always be produced experimentally by exposure to *x*-rays. This peculiar vulnerability has been ascribed to the congenital absence of elastic tissue in the upper corium which has been recorded in these cases, a finding which Sutton confirms. The treatment consists in protecting the subject from injury in every possible way, and in antiseptic precautions to prevent contamination of the excoriated surfaces when the bullæ break.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Ap. 2, 1910.

EPIDIDYMITIS, GONORRHŒAL.

(*Vol.* 1910, *p.* 293)—In the early stages, rest in bed, support for the testes, and ice applied locally, are indicated. In later stages hot compresses usually give most relief. **Puncture** of the tail of the epididymis with an antitoxin needle, inserted to a depth of 1 or 2 cm., once, twice, or thrice, relieves pain and promotes recovery.

EPILEPSY.

Use of **Bromoglidine** in (*page* 22); **Sabromin** in (*page* 49).

EPITHELIOMA. *E. Graham Little, M.D., F.R.C.P.*

Shoemaker[1] recommends the following treatment in superficial epithelioma. **Diet** should consist of food like eggs, milk, and cooked vegetables, with restriction of meat to one meal daily. **Internal Tonics,** including iron, manganese, sulphur, iodine, arsenic, strychnine, and cod-liver oil, are useful adjuncts. Local treatment consists first in free **Curetting,** and the application of an emulsion of **Jequirity Beans** (made by macerating the bean, deprived of its rind, in water). When the escharotic effect is completed, the wound is to be cleansed twice daily with a solution of bichloride, and the cavity is filled with finely divided red cinchona bark. This treatment should probably be confined to the less malignant type of epithelioma without glandular enlargement.

REFERENCE.—[1]*N.Y. Med. Jour.* Sept. 25, 1909.

EPITHELIOMA OF LIP. *Priestley Leech, M.D., F.R.C.S.*

Short[1] records the after-history of forty cases of epithelioma of the lip. Details of the operations and the results are given. The conclusions to be drawn are that if the glands are infected a very extensive removal of the gland area must be done to obtain good results. In twenty cases treated by local excision of the growth only, three died of recurrence (15 per cent). Even if the glands are not palpably enlarged, it is better to remove them thoroughly.

REFERENCE.—[1]*Brit. Med. Jour.* Aug. 20, 1910.

EQUINO-VARUS. (*See* CLUB-FOOT.)

ERYSIPELAS. *E. W. Goodall, M.D.*

Two fatal cases of afebrile erysipelas are recorded by Cameron Macaulay.[1] In one case the patient was a man aged fifty-eight; the right foot at first, and subsequently the whole of the lower extremity, were affected. There was severe diarrhœa. The patient was delirious almost from the beginning, and passed his excreta involuntarily. Towards the end he became comatose, and died on the eighth day. Only once was his temperature as high as 99·8° F.

The other patient was an infant aged three weeks. Erysipelas began round the right ear, and spread to the neck, shoulder, and thorax. The child died on the third day. Only once did the temperature rise to 99°. *Streptococcus erysipelatis* was obtained from the skin in this case.

See also **Neraltein** in (*page* 42); **Vaccine** treatment (*page* 57).

REFERENCE.—[1]*Brit. Med. Jour.* Feb. 26, 1910.

ERYTHEMA NODOSUM.

Methyl Salicylate, locally in (*page* 49).

ERYTHRODERMA SQUAMOSUM. *E. Graham Little, M.D., F.R.C.P.*

In no part of dermatology is there more confusion at present than in the classification of some of the exfoliative diseases grouped loosely by Brocq under the term "parapsoriasis." Ravogli[1] describes, under the title which heads this notice, a case which by Brocq would be

classed as "parapsoriasis en plaques." The patient was of Irish extraction, a male, aged thirty-seven. He had had syphilis several years previously, without recent symptoms. An eruption of small papules covered with scales appeared on the forehead, head, face, legs, and thighs. The nails were dry, thick, bulky, and broken. The papules coalesced to form large patches, covered by thin bran-like scales, which when removed showed no punctiform hæmorrhage. There were no subjective symptoms. The blood-count was normal. Histological examination showed congestion of the blood-vessels, perivascular cell-infiltration, œdema, and exfoliation of the stratum corneum. Thus the inflammation is confined to the epidermis and upper part of the corium, points in which it resembles psoriasis; but the clinical differences separate it sharply from psoriasis. Injections of **Cacodylic Acid** were of some use in treatment.

REFERENCE.—[1]*Jour. Cutan. Dis.* Ap. 1910, p. 175.

ETHMOIDITIS. (*See* NOSE, DISEASES OF.)

EXOPHTHALMIC GOITRE.

Pituitary Ext. of value in (*page* 47); **Thymus Gland** in (*page* 55); X-ray treatment (*page* 80).

EXOSTOSIS. *Priestley Leech, M.D., F.R.C.S.*

Winthrop[1] draws attention to a condition which was first described by Baer;[2] it is characterized by pain over the plantar surface of the heel, due to a chronic inflammatory change, of gonorrhœal origin, located in the flexor brevis digitorum muscle, with secondary new formation of bone or exostosis at the attachment of this muscle to the tubercle of the os calcis. This symptom of pain under the heel is usually ascribed to some other condition—flat foot, tuberculosis, osteomyelitis or sarcoma of bone, neuritis, bursitis, chronic rheumatism, rheumatoid arthritis, Schaffer's foot; and the close relation of the affection to gonorrhœa is overlooked. Baer says the inflammation starts first in the flexor brevis digitorum; and Jaeger states that pathologically the process is an ossifying periostitis. Baer demonstrated gonococci by culture in one case, and in sections in two cases out of four which were examined. Winthrop reports two cases. The only treatment is excision.

Morton[3] described a similar case, with radiographs, where there was no history of gonorrhœa.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Aug. 28, 1909; [2]*Surg. Gyn. and Obst.* Feb. 1906; [3]*Med. Ann.* 1910, p. 372.

EYE, DEFECTIVE VISION. (*See* VISION, DEFECTS OF.)

EYE, DISEASES OF, in Relation to Congenital Syphilis.

C. F. Marshall, M.Sc., M.D., F.R.C.S.

Terrien[1] remarks that ocular lesions may appear in infancy, at the period of puberty, during adolescence, or even at adult age. The most frequent lesion is interstitial keratitis, which is characterized by

leucocytic infiltration of the cornea; but the infiltration is not always limited to the cornea, and may extend to the iris, ciliary body, and choroid. Iritis may be present during intra-uterine life; but it more often appears after some months, and is generally unilateral. Choroiditis rarely occurs in an acute form; it is generally intra-uterine, and leaves cicatricial lesions in the fundus oculi. A special form of retinochoroiditis is pigmentary retinitis, which is always bilateral and is characterized by progressive sclerosis of the retina; there are small pigmentary foci, which are at first limited to the periphery, but slowly invade the central parts, till they reach the posterior pole, and are finally complicated by atrophy of the optic nerves. The symptoms are progressive contraction of the field of vision and hemeralopia, generally ending in loss of vision; but the progress is very slow, and atrophy of the retina may not be complete till the fortieth or fiftieth year. Blindness is never absolute, and a little central vision remains. The cause of pigmentary retinitis is not known, but syphilis must be regarded as a possible cause. The author does not hold that all congenital malformations of the eye are due to congenital syphilis, but the presence of certain malformations such as coloboma, irideræmia, papillary ectopia, micropthalmos, buphthalmia, infantile glaucoma, and congenital cataract, suggests syphilis as a possible cause.

Reference.—[1] *Jour. de Méd. Interne*, Dec. 10, 1909.

EYE, GENERAL THERAPEUTICS OF THE. *A. Hugh Thompson, M.D.*

Radium.—Speaking at the 1910 meeting of the British Medical Association, Mackenzie Davidson[1] expressed the opinion that radium will take a high place in ophthalmic therapeutics in curing superficial affections of the eye, though in relation to deep-seated affections it is powerless. *Rodent ulcer* has been cured by it, as it has by *x*-rays and by the light treatment. In *hypopyon ulcer*, *ulcers of the cornea* generally, *episcleritis*, and *pterygium*, it has yielded results superior to any other method of treatment. Five cases of *spring catarrh*, some of them extremely severe, have been cured by it. These good results are also spoken of by Arnold Lawson.[2] On the other hand, the attempts to treat trachoma by radium have been disappointing in the hands of some English surgeons who have tried it. The present prohibitive price, which Mackenzie Davidson attributes to false hopes of its being able to cure cancer, will in any case limit its sphere of usefulness. According to these authorities a supply of 20 mgrams is sufficient to combat any external affections of the eye in which radium is likely to be of service; for corneal cases 5 to 10 mgrams suffice. With regard to a time limit, an exposure of five minutes for the cornea, or three or four times as long for the skin or lids, was employed. In no single instance were the slightest ill effects observed.

Zinc Ionization, another of the newer methods, has been succesfully employed by Lewis Jones[3] in the treatment of *Mooren's chronic ulcer* of the cornea. This is interesting, as hitherto Mooren's ulcer has been looked upon as a slowly progressive and practically incurable

disease. The method consists in the passage of an electric current through a solution of zinc sulphate applied to the affected part. The solution is decomposed by electrolysis and the zinc "ion" caused to penetrate in the direction of the diseased tissue. (*See also page* 95.)

The technique is described by Jones as follows: "A loop of zinc wire or the end of a zinc rod is armed with a fine web of absorbent wool, and dipped in a solution of zinc sulphate 1 per cent. This forms the positive electrode, and is fixed in a suitable handle attached to the source of current. The negative electrode is the usual moistened plate or disc, applied to any convenient skin surface of the patient. The eye must be carefully cocainized, and the positive electrode then held lightly against the ulcer so as to bathe its whole surface with the zinc solution. An assistant then turns on the current very gradually up to 1 or 1½ milliampères, according to the size of the ulcer and the toleration of the patient. It must also be turned off very gradually at the close of the application. The current is to be applied for three or four minutes in one application, or for a little longer if done in two instalments. The patient needs to be carefully handled and encouraged, because it appears that the procedure is in some way disagreeable or alarming. At any rate, that has been my experience. The patients become agitated, although they admit that the application is not specially painful. Perhaps this apprehensive state is due to the indefinite image of the electrode, as seen out of focus, or it may be an effect of the current. The eye should be treated for a day or two by instillations of zinc sulphate (1 per cent) after the ionization is over. A single good application should cause healing within a week."

The method has also been employed in the treatment of dendritic and other *ulcers of the cornea*, and, using a copper instead of a zinc solution, *trachoma*, but as the results have varied in the hands of different operators, it is too early to say much about them. (The principles of ionic medication are described in the *Medical Annual* for 1909.)

A method of employing **Boric Acid** is recommended by Eisenstein[4] as being remarkably effective in curing those diseases of the eye which depend on the "lymphatic diathesis." The upper lid being everted, a thin layer of powdered boric acid is spread over it, after which gentle massage is performed over the closed lid. Cases that are at all irritable should be previously cocainized. This method he finds to be of great service in dealing with *phlyctenular conjunctivitis* and *keratitis*, with or without photophobia. When the cornea is ulcerated, further measures such as atropine will be required. Even in cases of *trachoma* with much conjunctival reaction, the boric-acid method is of great use, and since he has employed it the corneal complications that he has seen have been much fewer than before.

Dunn[5] advocates the use of **Thyroid Extract** in diseases of the eye due to malnutrition, such as phlyctenular disease and corneal ulcers, and among them he places *interstitial keratitis*. While not denying

the fact that it almost always occurs in syphilitic children, he considers that it is primarily dependent on a nutritional defect. Children take the drug well and can bear relatively large doses. Dunn's rule is to give a uniform dose of 3 gr. of the extract three times a day to children and adults alike.

Good results from the employment of **Antidiphtheritic Serum** for suppurative keratitis are quoted on *page* 8.

Arylarsenates.—In view of a qualified recommendation of soamin in last year's *Medical Annual* in the interstitial keratitis of congenital syphilis, it should be recorded that this drug is by no means free from the danger of causing blindness which has given a bad name to atoxyl. A case of complete optic atrophy after the administration of soamin has been shown to the Ophthalmological Society, and though it is true that this and the other similar disasters with atoxyl that have occurred have all happened to patients of middle or advanced age, the fact remains that in several cases in which one or other of the arylarsenates has been administered for syphilis, optic atrophy leading to incurable blindness has ensued.

Steindorff[6] has collected 95 cases of disturbances of vision or actual blindness following the use of atoxyl. There is gradual diminution of the visual field, more on the nasal than the temporal side. At first there are no ophthalmoscopic signs, except that the retinal arteries may be narrowed, the veins hyperæmic. After a few weeks the papillæ begin to appear pale, and the condition progresses with uncomfortable rapidity to complete optic atrophy. The prognosis is the more grave from the fact that the immediate stopping of the drug does not as a rule suffice to stop the progress of the condition, and that treatment has so far proved unsuccessful. In one case in which the optic nerve was examined microscopically, it showed symmetrical degeneration by Marchi's method.

Of the new remedy "606" we shall no doubt hear more. It may not be out of place here to call attention to the fact that it, too, is an arsenical compound, and that we seldom hear of the bad effects of new remedies until the second year after their introduction.

Local application of cold by means of **Carbon Dioxide Snow** is another recent method of dealing with some external eye affections. It has been employed by Bishop Harman and Morton[7] with success in the treatment of *nævi*, *papillomata*, and *rodent ulcers*, and with benefit in cases of *trachoma*. The patients experience a slight burning feeling at the moment of application, and slightly more sensation at the moment of thawing out, but nothing worth calling pain.

"*Mode of Preparation and Use of the Snow.*—Solid carbon dioxide is easily prepared. The gas can be procured in plenty, thanks to the aerated water industry. The compressed gas is sold in iron cylinders; it is cheap and clean. No other appliances are necessary for the production of the snow than a cylinder of gas, a towel, a cork, a brass tube, and a ruler that will fit into the tube.

The towel is rolled loosely around the ruler, the ruler withdrawn,

and the resulting tube of towelling closed at one end with the cork. The towel-tube is held mouth-up beneath the vent of the gas cylinder, which, being opened, emits the gas into the tube, wherein a large deposit of snow appears. This is removed from the towel, broken up, and then shaken into the brass tube and rammed down with the ruler. To make the snow pencil quite hard it may be hammered forcibly into the tube. Then the pencil is pushed out from the tube by the ruler. The snow pencil can be handled safely or covered with lint; its extremity can be cut with a penknife to any desired shape The hard pencil will gradually dwindle as it reassumes the gaseous form, but it will last for effective use from one to two hours.

In treating new growths, the pencil is shaped to the surface to be treated, and then pressed down on the tissue for about forty seconds; this is sufficient to completely freeze the tissue. In treating trachoma the lid is everted and separated from the globe by a non-conducting spatula. Then the pencil is lightly pressed down upon the portion of the conjunctiva selected for treatment for from fifteen to thirty seconds —for the shorter time at the beginning of the course, the longer time after a graduated increase with each weekly sitting."

REFERENCES.—[1]*Brit. Med. Jour.* Aug. 27, 1910; [2]*Trans. Ophth. Soc.* 1909, *Brit. Med. Jour.* Nov. 12, 1910; [3]*Ibid.* Aug. 27, 1910; [4]*Deut. med. Woch.* Jan. 27, 1910; [5]*Clin. Jour.* Feb. 16, 1910; [6]*Berl. klin. Woch.* Oct. 1910, in *Lancet*, Oct. 15, 1910; [7]*Brit. Med. Jour.* Oct. 29, 1910.

EYE, INJURIES OF. *A. Hugh Thompson, M.D.*

Stedman Bull[1] has been able to follow up 17 of his cases in which a metallic foreign body has been removed from the retina or vitreous by means of the **Giant Magnet** of Haab. In an eighteenth case the attempt to remove it was unsuccessful. The ultimate results were not encouraging: a cataract developed in 8 cases, phthisis bulbi in 6, and sympathetic uveitis in 8, an enucleation being necessary in 10. There was immediate useful vision after the removal of the foreign body in 2 cases. Permanent useful vision was not gained in any case. As the result of his experience, Bull is inclined to give up the Haab magnet. We have not properly appreciated, he says, the severity of the second shock of applying the giant magnet and forcibly drawing the foreign body through delicate tissues already seriously injured. "It seems far wiser to make an incision through the sclera at the nearest point to the location of the foreign body, and extract it by means of the small magnet." While the prognosis in these cases is always very grave, it is better when the foreign body is lodged in the vitreous than when it is in the retina or ciliary body. If the attempted extraction fail, it is better to enucleate the eye at once. Even after a successful extraction, useful vision will be permanently lost in the majority of cases, and enucleation will be necessary in order to save the second eye. The danger of sympathetic inflammation is ever present, and a general insidious uveitis may develop months and even years afterwards, and extend to the fellow eye.

Stedman Bull's experience compares very unfavourably with that of the Moorfield surgeons, whose experience up to 1901 was summarized by MacCallan.[2] Out of 29 eyes from which foreign bodies were removed from the vitreous by Haab's magnet, good vision was retained in 9, vision with possibilities of improvement in 5, without such possibilities in 3, and excision was performed in 12. Equally good results were reported by Goulden[3] for operations between 1901 and 1905. Out of 16 cases in which the foreign body was situated in the vitreous, and from which it was successfully extracted through the cornea or corneo-scleral junction, no less than 10 had vision of $\frac{6}{12}$ a year later. Of these cases, those in which the lens had remained uninjured did much better than those in which the lens was injured.

What appears to be an improvement on the giant magnet of Haab is the **Ring Magnet** of Mellinger, recommended by Harrison Butler.[4] "It is well known that when an electric current flows round a solenoid, a homogeneous magnetic field is generated whose greatest saturation lies at the centre of the axis of the solenoid. The lines of force lie parallel, and do not radiate away as with the ordinary magnet." The ring magnet consists of an oval ring surrounded by a large number of windings of copper wire of 1 mm. diameter, suitably insulated and enclosed. There is no central core; but if the patient's head be placed inside the oval ring his eyes will be in a saturated magnetic field, and any magnetizable body they may contain will exhibit magnetic polarity. If an iron rod be brought near the centre of the solenoid, it also will be powerfully magnetized. A small rod is first used. It is held like a pencil and approached to the eye. If the force be insufficient a larger rod is selected and the current increased. Percival finds that little difficulty is found in extracting the fragment by this means, but in those cases where the hand magnet would not have done equally well, the retina has generally become detached within six to nine months. It may be added, that the ring magnet is considerably cheaper than the giant magnet. (*See page* 74 for **X-ray** diagnosis.)

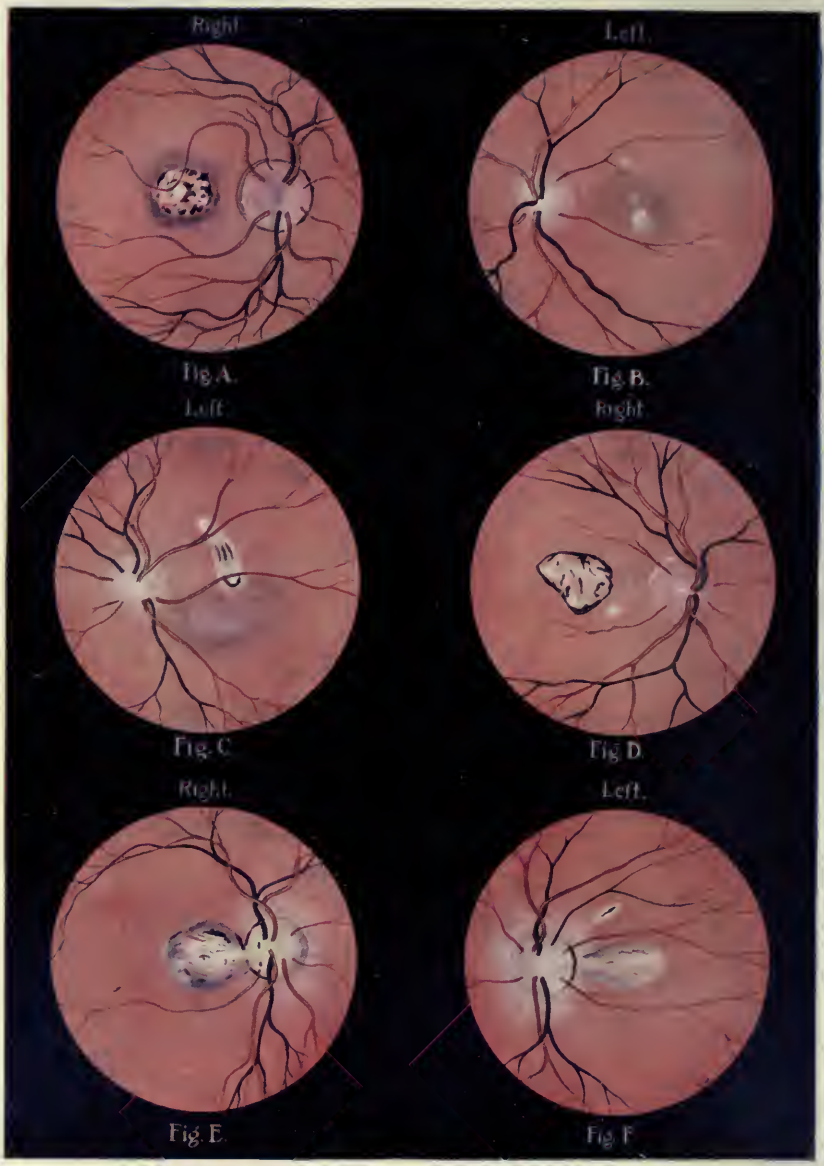
REFERENCES.—[1]*Med. Rec.* Aug. 27, 1910; [2]*Roy. Lond. Ophth. Hosp. Rep.* 1903; [3]*Ibid.* 1908; [4]*Ophthalmoscope*, 1909, p. 325.

EYE, TUBERCULOSIS OF THE. *A. Hugh Thompson, M.D.*

An interesting discussion on the relationship of tuberculosis to certain diseases of the eye took place recently in the ophthalmological section of the American Medical Association.[1] The diseases in question are phlyctenular conjunctivitis and keratitis, sclero-keratitis, and kerato-iritis. The evidence that any of these are tuberculous is partly clinical and partly founded on the reaction to the tuberculin tests. Of these tests the only very certain one seems to be a local reaction to the subcutaneous injection of old tuberculin, and the possible dangers connected with this procedure are such that many are chary of employing it. As to the ophthalmic reaction of Calmette, this may be considered dead as far as ophthalmic surgery is concerned. It is said to be not only uncertain, but dangerous, in its effects on eyes

PLATE XXVI.

OBSOLESCENT TUBERCLE OF THE CHOROID.



From Drawings lent by T. Harrison Butter, M.D.

already diseased, and even on normal eyes. Stargardt[2] relates instances of phlyctenules, keratitis, corneal ulcers, iritis, cyclitis, and even phthisis bulbi as having followed the instillation of a drop of tuberculin into normal eyes.

There remain the cutaneous reaction of von Pirquet and its modifications. Derby and Ayer have performed the test on nearly 200 patients, and have never seen any harm result. The very large proportion of patients in whom a positive reaction is obtained makes it difficult to argue much from it. A negative reaction, however, is a valuable piece of evidence against tubercle. Derby and Ayer exclude the diagnosis of tubercle on the evidence of two negative tests (with 100 per cent old tuberculin).

Clinical evidence of tubercle in other parts of the body does not prove that the particular affection of the eye is tuberculous, but if such evidence exists in a large proportion of cases, it does show that the affection is peculiarly liable to occur in tuberculous subjects.

A number of patients in whom the ocular disease suggested a tuberculous origin were submitted both to clinical examination and to tuberculin skin-reaction tests by Derby and Ayer.[3] Out of 14 cases of phlyctenular conjunctivitis 9 gave positive physical signs of tubercle. In 11 the cutaneous reaction was positive. Out of 52 cases of phlyctenular keratitis, 23 had positive physical signs, and in 48 the cutaneous test was positive. Out of 26 cases of scleritis, interstitial keratitis, uveitis, sclero-keratitis and kerato-iritis, the physical signs were positive in 18 and the cutaneous reaction was obtained in 24. Wilder[4] gives very similar figures: 47 out of 51 patients with phlyctenular disease of the cornea or conjunctiva showed distinct evidence of tubercle. Taking cases of interstitial keratitis in which with reasonable certainty syphilis could be excluded, out of 18 patients, 11 showed a positive general reaction to the subcutaneous test, and of these, 9 showed a local reaction in the affected eye, evidenced by increased ciliary injection or an aggravation of the condition. Of 12 cases of nodular keratitis, 11 showed evidence of tuberculosis. Out of 25 cases of scleritis and sclero-keratitis, 12 gave a positive general reaction to the subcutaneous test, there being a local reaction in the affected eye in 10. In chronic iritis and irido-cyclitis, uveitis, choroiditis, and chorio-retinitis there was also evidence of tubercle, but in a smaller proportion of cases. The evidence, therefore, of the connection between these various eye diseases and tubercle is strong.

The plates from a paper by G. T. Harrison Butler[5] show examples of *obsolescent tubercle of the choroid*. It will be noticed that in all of them (*Plate XXVI.*) it is the macular region that is affected. *Figs. A* and *B* show the fundi in the case of a boy. In the right eye the focus of tubercle is old and dried up; in the left eye it is active and had just begun to affect the vision. The diagnosis of tubercle was confirmed by general reaction to the subcutaneous injection of ·004 cc. of old tuberculin. A three months' course of tuberculin (T.R.) injections, and a supplementary one of six weeks, arrested the disease, with

retention of good vision. *Figs. C* and *D* show the late, quiescent stage in two more patients. In both cases the vision of the affected eye was practically gone, but tuberculin injections were undertaken in the interests of the fellow eye. *Figs. E* and *F* are from a patient of 27, practically blind, who showed a general reaction to injections of old tuberculin.

For the treatment of such conditions as this before they have advanced to a hopeless stage, injections of new tuberculin (T.R.) are sometimes effective. (Tuberkelbazillenrückstand = tubercle remainder.) It should be diluted to the required strength shortly before use, and the initial dose should be small ($\frac{1}{10000}$ mgram to $\frac{1}{500}$ mgram). Its administration should be checked by the temperature, and if this rises to 100° it should be suspended. The followers of Sir A. Wright check it by the opsonic index, but the difficulty of getting reliable results by this method is so great that most prefer to judge by the clinical signs alone.

Hygienic measures must not be neglected. Derby and Ayer describe an organization that has been established in connection with the Massachusetts Charitable Eye and Ear Infirmary, by which the patients are visited at their own homes by a nurse or social worker in the intervals between being seen by the surgeon. Rest is insisted on during an active inflammation, and especially if the temperature is elevated during any part of the day. The patients are taught cleanliness, and how to get the maximum of fresh air. They have the usual antituberculous diet and forced feeding. A certain amount of money is at the disposal of the organizers. If the class treatment is unsuccessful, the case is referred to a sanatorium.

References.—[1]*Jour. Amer. Med. Assoc.* May 28, July 2, 1910; [2]*Zeits. f. Augenheilk.* July, 1909, rev. in *Ophthalmoscope*, Jan. 1910; [3]*Jour. Amer. Med. Assoc.* May 28, 1910; [4]*Ibid.* July 2, 1910; [5]*Ophthalmoscope*, June, 1910.

FACIAL PARALYSIS. (*See* Nervous System, Surgery of.)

FÆCES, EXAMINATION OF. *Robt. Hutchison, M.D.*

A detailed account of this subject appeared in the *Annual* for 1908, and recent publications have added but little to what it contained. Whilst most writers are agreed as to the advisability of a test-diet, there is some difference of opinion as to its composition. Kraus[1] finds it sufficient if the patient includes the following substances in his dietary for about forty-eight hours: (1) Milk, undiluted or mixed with coffee; (2) Eggs; (3) Animal food such as fish, poultry, beef, veal—boiled or roasted; (4) Farinaceous food, including bread, potatoes, and rice; (5) The various green vegetables and roots; (6) Stewed fruit; and (7) Butter, bacon, ham, and the fat of meat. The choice of these articles, as well as the amount taken, may be left to the patient's taste.

Hewes[2] employs a diet of the following composition:—*Morning*: Two thin slices of twice-baked bread, with butter liberally applied; one pint of oatmeal gruel, made of about 40 grams of oatmeal, 10 grams

of butter, 200 grams of milk, 300 grams of water and 1 egg (strained). 11 *a.m.*: Milk, 1 pint. *Noon*: A good-sized piece of steak, or roast beef, chopped or cut into very fine pieces (about 125 grams) and served on 1 slice of toast; one bowl (about 250 grams) of mashed potato with 10 grams of butter. 4 *p.m.*: One pint of milk. *Night*: Same diet as breakfast. This diet is based upon the general plan of the Schmidt test diet. It is, however, simpler of preparation and more palatable. It contains sufficient food value, calorie value, nitrogen value, and mineral salts, to keep the individual nourished, and has a fair mixture of the three food principles, fat, carbohydrate, and proteid.

The diet is given for a period of three or four days. All stools obtained within a period of thirty-six hours after the initiation of the special dietary régime, or if no stool is obtained within this time, the first stools obtained on the régime are discarded, and subsequent stools used for examination. Record should be made of (1) The amount of fæcal excretion in twenty-four hours, whether normal or excessive, as compared with the normal; (2) The general physical character of the stool, whether loose or formed, etc.; and (3) The character of the food content as determined by macroscopic and microscopic examination.

The muscle, starch, fat, and cellulose food elements can all be recognized by simple microscopic examination, with the aid of a few simple chemical tests performed upon the specimen under the cover-slip as prepared for microscopic examination. Muscle fibres are recognized by their morphology. Starch remains may be identified by the addition of a drop of Lugol's I.K.I. solution to the specimen. Fat remains may be present in the form of neutral fat globules or masses, crystals of fatty acid, splinters of fatty acid or soap, and as masses of calcium or magnesium soap. The neutral fat may be identified by the addition of a drop of an alcoholic solution of Sudan III or Scharlach R. Cellulose particles are recognized by their morphology.

Fatty acid crystals are dissolved on warming, and in ether; soaps are soluble in water but not in ether.

One of the best tests for soaps is to warm the stool on the slide with a drop of acetic acid, and watch the crystals of fatty acid crystallize out. The drops of neutral fat are soluble in ether and give the Sudan III test; but droplets are seldom seen unless there is a great increase in the stool. Hawes has shown that an increase of visible fat under the microscope will certainly mean an increase of fat in the stool, but there may be an increase of the total fat without any visible evidence of it. An easy way to test the presence of fat in the stool is to press a portion under a cover-glass. If the portion selected be mucus or vegetable tissue, the glass, when released, will spring back and, air will rush in under the cover from all sides. If fat, the glass will stay down.

References.—[1]*Lancet*, July 9, 1910; [2]*Bost. Med. and Surg. Jour.* Jan. 27, 1910.

FAGOPYRISMUS. (*See* PELLAGRA.)

FALLOPIAN TUBES, DISEASES OF,

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

Extra-uterine Gestation.—Smallwood Savage[1] has published an interesting paper on this subject founded on a number of cases occurring in his own practice. As is well known, the gestation sac formed early in tubal pregnancy is situated in the wall of the tube, and from thence may rupture in one of three directions: (1) Intramural rupture; (2) Intratubal rupture; (3) Extratubal rupture. He gives the following criteria of each of these events: (1) In intramural rupture, the tube lumen is intact and no blood is contained in it, no external rupture is to be seen, nor any blood in the peritoneum, but in the tube wall an extravasation is situated. (2) In intratubal rupture the lumen of the tube is broken and contains blood, which is also probably present in the peritoneum. (3) In extratubal rupture the tube lumen is intact and contains no blood, but an external rupture of the tube is present, and the peritoneum contains blood.

Carcinoma of the Fallopian Tube.—Alban Doran,[2] the greatest authority on the subject, has completed a collected series of 100 examples of this unusual condition. He begins by relating a case in his own practice. The patient had an abdominal swelling, and at fifty-seven had begun again to have regular losses of blood per vaginam. The tumour when removed proved to be a primary villous carcinoma of the tube. He then proceeds to analyze the last thirty-eight cases included in his full list, the remainder having received notice in a former publication. As regards age, carcinoma of the tube is most frequent at and for a few years after the menopause. Two of the patients, however, were under thirty years of age. Parous women are somewhat more prone to the disease than those who are sterile. The duration of the disease is not long as a rule, but in two there was a history extending over three years.

Pain was present in twenty-five of the thirty-eight cases, and bore a relation to one of the cardinal symptoms of the disease, namely, a watery bloody discharge from the uterus. It is due, according to Doran, to obstruction to the escape of the watery fluid secreted by the new growth. In all the cases a tumour was detectable; but the most characteristic symptom of the condition is a *free sanious watery discharge from the uterus*, which occurred in 27 per cent of the recorded cases. Co-existent myomata of the uterus and cystic tumours of the ovary were noted in 9 per cent and 4 per cent of the cases respectively. Ascites is not commonly met with; when it occurs it is due to patency of the abdominal ostium permitting the escape of the tubal contents into the peritoneum.

The origin of the growth is generally held to be due to chronic inflammation of the tube. Sanger and Barth, in 1895, declared that it always develops at the seat of a chronic salpingitis, most frequently for long quiescent. Doran concludes from a review of his series of cases

that this is the theory most supported by evidence. An interesting fact is that the growth is bilateral in over one-third of the cases. The histology varies, it being columnar or spheroidal-celled, and in arrangement cylindrical, alveolar, or papillary.

The operations performed varied from removal of the tube alone to radical clearing out of the internal genitalia. The general operative mortality was 6 per cent.

Doran's paper is an important contribution to gynæcological literature. The disease occurs so rarely that few have had experience of it. The value, therefore, of such a series as that placed before the profession by this indefatigable worker is very great. Doran himself reported in 1879 a case of innocent papilloma of the tube associated with extreme ascites due to escape of the tubal fluid through the abdominal ostium. A few similar cases have since been reported. The relation of these papillomata to carcinoma of the tube is probably close, and there is some evidence that transformation of one into the other may occur. Microscopical investigation of chronically inflamed tubes shows that in many of them great proliferation of the epithelium has occurred, forming masses of epithelial-lined alveoli detached from the tube lumen. This epithelial proliferation producing sequestered crypts or adenomatous elements in a tissue previously not containing them, is paralleled in the case of a cervical "erosion" in which, as a result of chronic inflammation, an adenomatous architecture takes place *de novo*. The relation between inflammation and epithelial hypertrophy as a prelude to carcinoma was insisted on by the present writer in the Hunterian Lectures at the Royal College of Surgeons in 1908. The subject of carcinoma of the tube was not there touched upon owing to want of material for its study. Doran's paper, however, supplies the hiatus, and supports the views then enunciated.

He sums up the practical outcome of his exhaustive study in these words: "Primary carcinoma of the Fallopian tube is clearly not a malady of extreme rarity. As in at least 27 per cent of all cases, distinct and more or less free watery discharge is present, it is clear that when that symptom is found to be associated with a pelvic or abdomino-pelvic tumour, an exploratory operation should be performed, and that if the tumour or the tube is detected, the uterus and the remaining appendages should be removed as well as the affected tube."

Bryden Glendining[3] communicated a report on the spread of carcinoma from the ovary viâ the Fallopian tube. In both the cases on which his paper was founded the primary growth was in the stomach, with metastases in the ovaries. In neither did the Fallopian tube present macroscopical evidence of growth, but microscopical examination showed extensive invasion of its wall, chiefly limited to the tubal plicæ. A remarkable feature was the presence in the tube lumen of free masses of cancer cells, and Glendining considers that the mode of tubal infection was chiefly by detached fragments of the growths finding their way into the tube through the abdominal ostium, and grafting on its inner surface, from whence they travel to the deeper

parts. He remarks on the fact that throughout the peritoneal cavity there are but two structures devoid of endothelial covering. One is the ovary, and the frequency with which secondary carcinoma is met with in this organ is suggestive in this connection. The second structure is the columnar surface of the tubal fimbriæ, and his cases tend to show that secondary growth of cancer upon this surface is probably not infrequent.

REFERENCES.—[1]*Pract.* Jan. 1910, p. 38; [2]*Brit. Jour. Obst. and Gyn.* Jan. 1910, p. 1; [3]*Ibid.* p. 24.

FAVUS.

(*Vol.* 1910, *p.* 310)—Persson records the cure of a very chronic case by **Inoculations** of the fungus grown from the patient's skin. Lawrie reports two cases cured by soaking the scalp for several minutes daily with crude **Petroleum**, gentle friction being practised.

FIBROSITIS. *Robt. Hutchison, M.D.*

A brief reference was made to this condition in last year's *Annual*, under the heading "Rheumatism"; but the malady is such a common one, and is still so little understood, that it may be well to refer more fully to recent publications on the subject.

The term fibrositis was introduced by Sir William Gowers[1] to cover many chronic affections which are common in the latter half of life, and which are usually described as "rheumatic." The essential pathological change in these affections is an inflammatory hyperplasia of the white fibrous tissue in various parts of the body. The articular structures proper—synovial membrane, cartilage, and bone—are not primarily affected; but the parts implicated are the fibrous tissues of the joints, muscles, and bones, especially the aponeuroses and insertions of the muscles, fasciæ, the fibrous ligaments of the joints, and the periosteum. Such affections cause pain and stiffness in these structures, are especially apt to recur, and are commonly referred to as rheumatic or even gouty in their origin. This inflammatory hyperplasia of the fibrous tissues occurs in patches, and is started by exposure to wet or cold, by injury, or by some irritant, microbic or toxic, conveyed in the blood. The inflamed and swollen fibrous tissue is tender, painful on pressure or on movement, and can frequently be felt on palpation, or is evident by the consequent elevation of the skin. This fibrositis may completely disappear, but recurrences are common, and if not suitably treated, the thickened fibrous tissues remain as indurations at various parts.

The indurations may be widespread, but generally are well defined, and vary in size from an eighth of an inch to one inch in diameter. They may be situated in the subcutaneous tissue, the muscles, tendons, aponeuroses, and periosteum. The pain is especially aggravated by any sudden movement of the muscles, which compresses or stretches the affected fibrous tissues and the sensory nerve filaments.

The following are the commonest causes of local fibrositis: (1) Cold, damp, and wet; (2) Sudden changes in temperature or barometric pressure; (3) Local injury or strain; (4) The presence in the circulation

of toxins derived from the alimentary canal or produced by various infective organisms. The chief forms that it assumes are (Luff[2]): (1) Muscular "rheumatism," e.g., lumbago, stiff neck, "deltoid rheumatism," intercostal rheumatism, etc.; (2) Dupuytren's contraction; (3) Fibrositis of the plantar fascia (producing painful heel); (4) Pads upon the finger joints; (5) Chronic villous synovitis (producing creaking joints).

Murray[3] has directed special attention to fibrositis of the abdominal muscles, as being apt to simulate intra-abdominal disease. There is no superficial or cutaneous tenderness; but deep pressure over the muscle, especially when it is strongly contracted, elicits tenderness at one or more points. This is a valuable test, especially in the case of abdominal muscles. If, for example, the pain complained of is in the region of either of the recti abdominis muscles, it may be found—when the patient is examined lying flat on the back on a couch—that there is no marked tenderness on pressure over any part of these muscles. If the patient is asked to raise the trunk until its long axis forms an angle of forty-five degrees with the surface of the couch, so that the recti muscles are strongly contracted, it will be found on pressing the tip of the finger firmly into the contracted muscle, at the point where the pain is usually felt, that it is acutely tender. These localized areas of tenderness in the muscle during strong contraction are of much assistance in distinguishing fibrositis of the abdominal muscles from intra-abdominal conditions. In intra-abdominal disease the tenderness is complained of when pressure is made over a relaxed muscle, or there may be a reflex contraction of the muscle which prevents deep pressure being made; whereas, in fibrositis there may be but little tenderness when the muscles are flaccid, but acute tenderness on pressing firmly on the muscle when it is in active contraction.

TREATMENT.—In acute cases a **Saline Purge** should be given at the outset and the patient confined to bed, the affected muscle being kept in a relaxed position. A hot **Vapour Bath** or the **Electric-light Bath** is very useful at this stage. No special dieting is required beyond the injunction of strict moderation.

Drugs.—During the acute stage **Aspirin** is useful in doses of 5 gr. every four or six hours. In gouty subjects an alkaline mixture with **Colchicum** may be given. In the chronic stage **Iodide of Potassium** in 5- or 10-gr. doses, combined with tonics, is to be preferred. Luff recommends **Fibrolysin** in cases of local fibrositis accompanied by thickening and contraction (e.g., Dupuytren's contraction). It should be injected into the deep subcutaneous tissues of the upper arm on alternate days, thirty to forty injections being given in all. After twenty injections have been given, massage and passive movements should be begun.

External Applications.—In the early stages of an acute fibrositis, **Hot Fomentations** are useful. Afterwards, one of the best external applications is a mixture of equal parts of **Chloral Hydrate, Camphor,** and **Menthol.** These three substances form a liquid when well rubbed

together, which should be painted over the painful area, and then be gently rubbed in with the fingers. Some patients find the cold sensation produced by the menthol objectionable; in such cases the menthol may be omitted, and equal parts of chloral hydrate and camphor employed, which also form a liquid when rubbed together. Another useful external application is to paint the painful area with tincture of **Iodine,** and then to apply a hot linseed poultice or a very hot fomentation. The heat converts the iodine into vapour, which exercises an anodyne effect and, probably by absorption, directly acts on the affected fibrous tissues. In the later stages the **Aconite, Belladonna, and Chloroform Liniment** applied on lint is frequently most beneficial. In cases of a very localized fibrositis, counter-irritation is sometimes of great use, especially in the form of the **Thermo-cautery.**

In strictly localized forms of fibrositis, and especially in cases of lumbago and chronic villous synovitis of the knees, the most effective form of local treatment is the employment of superheated air followed by **Ionization** (cataphoresis) of the affected joint or part. In cases of affected joints, Luff orders the employment of the superheated air cylinder, and in cases of lumbago, either the entire body electric light bath, or the application of superheated air locally by one of the forms of apparatus that have been devised for the purpose. The application of the superheated air lasts for fifteen to twenty minutes, and is immediately followed by ionization lasting from ten to fifteen minutes.

In chronic joint cases and in chronic cases of lumbago, he orders the employment for ionization of a 2 per cent solution of **Iodide of Lithium,** and directs that the negative ion (the iodine) should be driven into the affected tissues. In cases of acute lumbago, ionization should be done with a 2 per cent solution of **Salicylate of Sodium** at the first sitting or two, in order to produce immediate relief of the severe pain. The salicyl ion is introduced into the painful region, and it is remarkable how rapidly it will relieve the pain, just as salicylic ionization rapidly relieves the pain of most cases of severe neuralgia and some forms of neuritis.

Massage and Exercises are very useful in the later stages, but should not be employed when pain is present. In obstinate cases a course of douche-massage at a spa may remove the last traces of the attack.

References.—[1]*Brit. Med. Jour.* 1904, i., p. 117; [2]*Lancet,* Mar. 12, 1910; [3]*Clin. Jour.* May 4, 1910.

FILARIASIS. *J. W. W. Stephens, M.D.*

E. S. Jackson[1] contributes historical notes on the discovery of *F. bancrofti.* The adult worm was discovered by Dr. Joseph Bancroft, in Brisbane, in 1876, in a lymphatic abscess. The following statement is interesting as bearing on the disputed nature of elephantiasis. Bancroft believed the worm to be the cause of chyluria, some form of hæmaturia, one form of spontaneous lymphatic abscess, a peculiar soft varix of the groin, a hydrocele containing fibrinous fluid, another containing chylous fluid, together with some forms of varicocele and

orchitis. Up to 1877 Bancroft had been unable to find any case of elephantiasis or lymph scrotum in Southern Queensland. Ten years later there was one.

C. Wellman and E. von Adelung[2] record the apparent cure of a case of hæmatochyluria. The treatment was introduced by Wherry and McDill, and consists in cinchonization and subsequent exposure to *x*-rays. The patient was a Japanese, with no symptoms except the character of the urine and weakness. The urine was almost as turbid as milk, and had a decidedly bloody tinge. It contained no embryos, although the blood did. Fifty to seventy grains of **Quinine** were given from Dec. 28 to Jan. 12 : in the latter part of this period only 15 gr. a day. **X-ray** exposures (12-in. coil ; direct current ; Wehnelt interrupter ; 6¾-in. bulbs—Friedlander and Gundelach—distance from target *to table top* 15 in. ; 3-in. vacuum, which sometimes ran up to 6 or 7 in. during treatment) were given on Dec. 14, 1¼ mins. ; Dec. 22, 1 min. ; Dec. 31, 1 min. ; Jan. 7, 45 secs. ; Jan. 12, 31 secs. On Jan. 14 the urine was perfectly clear ; no albumin. On Jan. 12 the embryos still persisted in the blood, but in very small numbers. The patient was practically cured, though time will show whether the cure was permanent or not.

K. W. Wise[3] describes a condition of acute filariasis of the testis and spermatic cord. The essential lesion is exactly similar to the abdominal lesion of filarial disease of the legs. The clinical aspect closely resembles peritonitis : fever, bilious vomiting, pain in the belly, constipation. Usually there is only a fullness below Poupart's ligament. There is no lymphatic change in the skin ; sometimes there is purulent effusion into the tunica vaginalis. Post mortem the right spermatic cord measures 2 in. in diameter. The epididymis and spermatic cord are occupied by a dense mass of a semipurulent material ; the lymphatic glands are also purulent. Usually adult *F. bancrofti* are found at the junction of testis and epididymis in a small abscess. They are dead, and the eggs and larvæ are found outside the body of the worm. Treatment consists in free **Incision.**

Chyluria.—The author gives some interesting particulars about the urine in these cases. The reaction is alkaline, and contains no sugar, and, moreover, in his experience, no fat ; but the milky opacity is due to a large proteid content. The appearance of the urine on passing is a light brick-red, opaque, opalescent fluid, with some streaks —clots of blood—in it. The urine of old cases settles on standing into three layers : at the bottom a thin red deposit of blood cells and clot (⅛) ; in the middle a milky-white, slightly brown crimson, with loose fibrinous clots in it (⅜) ; the top layer white opalescent (⅜). In recent cases there are only two layers : the bottom deposit of red cells-clot (⅛) ; the top a deep brown crimson (⅞) with bulky fibrinous clots. In five cases no larvæ were found in the urine.

References.—[1]*Austral. Med. Gaz.* May 20, 1910 ; [2]*Jour. Amer. Med. Assoc.* Ap. 23, 1910 ; [3]*Report Surg.-Gen. Brit. Guiana,* 1907–1908, in *Jour. Trop. Med.* May 2, 1910.

FLATULENCE. *Robt. Hutchison, M.D.*

Boas[1] understands by flatulence a condition in which there is either (1) An excessive but painless discharge of gas, or (2) The passage of gas in normal quantity, but with more or less pain (flatulent colic).

1. The abnormally free passage of gas may be the result either of excessive introduction (e.g., air-swallowing, gassy drinks, etc.), or of fermentation. In the former case the gas is odourless, in the latter not.

2. Flatulent colic results from fermentation associated with constipation, and often with intestinal catarrh. It may also be the consequence of congestion from defective circulation in the wall of the bowel.

Boas is opposed to the indiscriminate use of carminatives and antifermentatives in flatulence. Each case must be treated on its merits. The flatulence which results from air-swallowing can only be overcome by improved habits, and by a toning up of the whole nervous system. It is apt to be very obstinate. Special dieting is unnecessary.

The indications are different with the form of flatulence depending on habitual constipation and chronic catarrh of the intestinal passages. Here, as scarcely need be mentioned, the action of the bowels must be carefully attended to by prescribing a suitable diet calculated to bring them into a normal condition, so that any stagnation may be most carefully avoided. Often enough, and especially in the habitual constipation accompanied by catarrh of the large intestine, success may be obtained without difficulty. In some individual cases, however, the formation of gas not only persists, but is associated with painful colic. In that case, the effect of diet must be carefully investigated. Milk, eggs, and red meats are foods which are specially apt to be harmful; but often enough we must test every article of food separately in regard to the effect any one of them may have in increasing the flatulence.

In intestinal dyspepsia with fermentation, Herm. Meyer has had good results from complete elimination of the carbohydrates, and giving a purely albuminous and fat diet. Potatoes especially, appeared to him to keep up the flatulence, whilst sugars, dextrinized meal, fine wheat meal, white bread, and well-cooked rice, were much better borne.

Although this kind of systematic testing of food requires a good deal of patience and waiting, up to the present there is no more suitable way of freeing a patient of his troubles, always supposing the evacuations are normal both in quantity and quality.

As regards drugs, besides purgatives, there is only one which he has found useful, that is, **Salicylate of Magnesium** in doses of 15 to 45 gr. three times a day in tablets or powder. The best aperients are small repeated doses of **Castor Oil** or the bitter waters.

In cases of flatulence due to congestion from cardiac disease, attempts should be made to improve the circulation by **Digitalis, Strophanthus,** or **Diuretin.**

Ewald[2] defines distention of the abdomen with gas as *meteorism* or

tympanites, and reserves the term *flatulence* for cases in which gas is discharged per os or per anum. The latter is dependent upon diet; the former not.

1. *Gastric meteorism* may be due to air-swallowing, to fermentation, or to spasm of the pylorus (e.g., post-operative).

2. *Intestinal meteorism* may be "hysterical," or result from peritonitis or nervous paralysis. It is also brought about by the same causes as gastric meteorism.

Flatulence may be divided into cases due to a neurosis, and those which result from some disturbance of intestinal function. Both may co-exist. In the treatment of intestinal flatulence and meteorism he believes in **Asafœtida,** but the most effective agent in meteorism is **Opium** or **Chloroform** narcosis. The directions which Ewald gives about diet and aperients are practically the same as those of Boas. He thinks charcoal is useless and the action of "intestinal antiseptics" very limited.

REFERENCES.—[1]*Med. Press,* Mar. 23, 1910; [2]*Deut. med. Woch.* Ap. 7, 1910.

FRACTURES. *Priestley Leech, M.D., F.R.C.S.*

Hogarth Pringle[1] gives his experience of fractures of the upper extremity of the femur. During the last five years he has seen 33 cases of fractures of the upper end of the femur, of whom 5 died in hospital (4 in consequence of lung complications and 1 from apoplexy), while 13 were sent home at the earliest moment, as from various causes their condition precluded any surgical interference. In the remaining 15 cases he has corrected the deformity as far as possible.

The injury most frequently seen in this neighbourhood is the "intertrochanteric fracture," or "fracture of the base of the neck of the femur." The really intracapsular fracture is decidedly less frequent; out of 33 cases, there were only 10 as examined by the *x*-rays. In fracture of the base of the neck, impaction with comminution is usual; these fractures nearly always unite by bone, but always with deformity unless surgical interference is undertaken. There is eversion, sometimes extreme, and if there is marked shortening as well, the patient is very much crippled. To relieve this the impaction must be broken down. Hogarth Pringle has done this, and even if the eversion is not entirely corrected but diminished, it adds to the patient's comfort. Latterly, after the manipulation he has applied extension to the limb instead of using splints, and the results have been much more satisfactory. The modus operandi is as follows: Under general or spinal anæsthesia the impaction is cautiously undone by abduction and internal rotation, with some flexion at the hip joint, while the pelvis is fixed by an assistant. When brought into good position, extension weights are applied, and the limb is kept in extension, well abducted at the hip joint, and supported by sand-bags in order to prevent recurrence of outward rotation. It is of service to have a transverse pull round the pelvis towards the sound side; this prevents the patient slipping from position, and allows the extending pull in the limb to be

more effective. The great advantage of the extension method is that the patient may be permitted to sit up in bed from the first, and thus the risk of pulmonary complications is avoided. The hip, knee, and ankle joints can be exercised throughout the treatment (when the patient sits up, the pelvis moves at the hip-joint, the head of the femur remaining in line with the shaft). Extension is kept up for eight weeks, but the patient must not put weight on the limb for at least ten weeks. Where no impaction exists, the treatment consists in extending the limb which is abducted at the hip joint. Where nothing is done at the time to correct the deformity, a good result can be obtained by a subtrochanteric osteotomy and inversion of the limb below the point of the bone section.

The real intracapsular fractures of the neck of the femur are not very common ; they may be complete or incomplete—the latter more frequent than is supposed in young people—and they lead to coxa vara. The complete fractures occur almost invariably just where the head joins the neck, and are seen in young patients before the age of twenty years and in old patients, but very seldom at the intermediate time of life, In young patients they are separations of the epiphysis of the head, and both in these young patients and in old ones, they are usually the result of torsional violence. In these intracapsular fractures, unless impacted, which is rare, osseous union is not to be expected unless operation is done. The position of the limb is that characteristic of a pubic dislocation of the hip joint, i.e., the limb is flexed and everted at the hip, and shortened. In two cases of separation of the epiphyseal head, Pringle got perfect union of the fracture by pinning the fragments after opening the joint from the front. He thinks this ought to be attempted before removal of the head is decided upon. In older patients with sub-capital fractures the question is different. If the patient's tissues are not in good order, possibly excision of the head had better be done ; if, however, the tissues are in good order, an attempt might be made to fix the fragments. In these cases he fixed the head to the neck by a pin driven in through the great trochanter, after having previously opened the joint from the front. One did well ; the other two got absorption of the head of the bone. He thinks it improbable that the two fragments can be fixed in a good position unless the joint is opened from the front, so as to be certain that they are really in correct relation to one another.

Chapple[2] has used the splint shown in *Fig.* 14 in cases of fractured femur which have been wired ; it allows of movement at the knee-joint. [Extension with sand-bags, however, would allow of massage of the limb and movement of the knee joint.—P. L.]

The tendency to operative treatment of fractures is becoming more marked, if the surgical literature of the past year is taken as a guide. Except in certain fractures there is yet, however, no general agreement as to the line to be pursued. Most surgeons are agreed that in fractures of the patella, the olecranon, and of the head of the humerus, operation is indicated, provided strict asepsis can be obtained and there are no

general contraindications. It is when the other fractures, not compound, are in question, that there is a wide divergence of opinion in all countries.

De Bovis, of Reims,[3] reviews the whole subject, with copious references to English, French, German, and American literature. The evidence from all countries shows that the results of non-operative treatment are not all that could be desired; but against this it is urged by many surgeons that the non-operative treatment of fracture does not receive the attention it ought. Those cases are often left with house surgeons to treat; they are sent out in fixed forms of apparatus, and no attention is given to their after-treatment—a most essential thing. If, however, a fracture is operated on, far more care is given to the after-treatment. On the other hand, the operative treatment has its drawbacks: the great protagonist of this treatment, Arbuthnot Lane, insists on the great care that must be exercised to prevent sepsis, and the great difficulty that may be encountered in reducing the fracture, even when the two fractured ends are exposed; besides this, the wires introduced may lead to a rarefying osteitis; the callus may be small in amount, and hence the patient may not be able to bear the weight of the body on the fractured limb any sooner than, if as soon as, when treated by the older method.

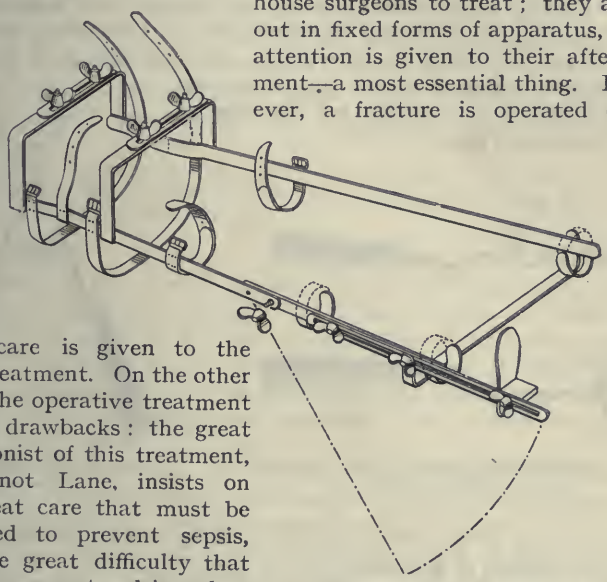


Fig. 14.—Splint for fractured femur.

This subject was discussed at the annual meeting of the British Medical Association,[4] and by Mr. Arbuthnot Lane[5] before the American Medical Association; the conclusions that an impartial reader may draw is that nearly all those who strongly advocate operation are hospital surgeons, and they fail to recognize that if the operative treatment of fractures becomes the routine treatment, either all cases will have to be treated in hospitals by competent surgeons, or patients with fractures are going to run the risk of being operated on under conditions which are not ideal for the carrying out of an operation demanding the most perfect aseptic

technique if the results are not to be worse than those obtained by careful non-operative treatment.

Gibbons[6] describes the results of the treatment of fractured limbs in workmen. He gives a list of some 54 fractures; and of 10 fractures of the thigh, only 3 are likely to follow their old employment. He thinks that under the Workmen's Compensation Act the inability to obtain sufficient food may be one factor in retarding the recovery from a fracture.

Rutherford Morison[7] had long been on the look-out for some appliance which would hold the fractured ends of bone together until union had occurred, and then be removable. A case where the femur was fractured at the site of union where wire had been used (the bone had become softened round the wire, and could be cut with a knife) led Morison to devise this clamp (*Figs.* 15, 16).

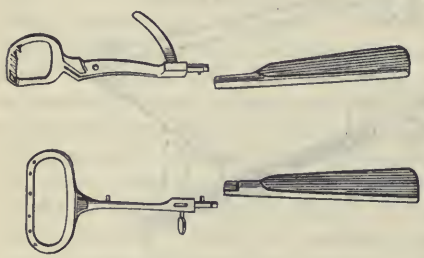


Fig. 15.—Rutherford Morison's bone clamp, showing the four separate portions.

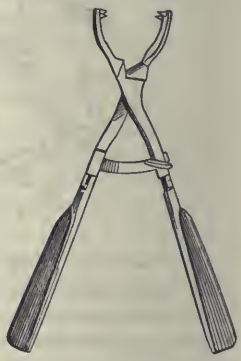


Fig. 16.—The clamp ready for use.

The clamp is in two halves which are united by a detachable joint. Each half consists of an oblong rim of thick tough steel with rounded corners, and with its surfaces flattened from side to side, the whole being slightly convex on the outer sides. From the middle of each jaw projects the handle of the instrument, also made of steel, and one inch from the jaw is the site of the joint between the two halves of the clamp. Upon the inner surface of the front of the jaw five steel teeth are firmly fixed. The three central teeth project inwards three-sixteenths of an inch; they are half an inch broad and are wedge-shaped on section; the remaining teeth are conical and also project three-sixteenths of an inch. The free edges of these teeth are sufficiently sharp to grip firmly the surface of a bone when the clamp is applied. The handles are 3¼ in. long, and are made so that detachable handles of equal length can be affixed, a greater purchase thus being obtained in the clamping of the bone at the operation. The mechanism for securing the clamp, when it has successfully grasped the bone ends, is a ratchet with a set screw. The size of the oblong portion varies according to the bone to be clamped; the teeth and handles (fixed and detachable portions) are the same in all. The

two halves of the instrument are united by a joint which is detachable in order to facilitate removal.

He has successfully used the clamp in five cases. The technique of the operation is as follows: The bone ends are exposed through an incision parallel to the long axis of the bones. Of the five opposing teeth of the clamp, two pairs must grasp the lower fragment, two pairs the upper fragment, and the remaining pair will be in the neighbourhood of the site of the fracture; the teeth must grasp the bone half-way between the anterior and posterior surfaces. If the clamp has been properly applied, the fragments are quite firmly held together. The detachable handles are then removed, the wound sewn up except where the points for the handles project, and a dressing and a splint applied. After six or eight weeks the clamp can be removed under an anæsthetic by re-opening the wound a little and rocking the clamp out by means of the handles.

REFERENCES.—[1]*Pract.* Oct. 1909; [2]*Ibid.* Feb. 1910; [3]*Sem. Méd.* Feb. 16, 1910; [4]*Lancet*, July 30, 1910; [5]*Ann. Surg.* Dec. 1909; [6]*Brit. Med. Jour.* Feb. 5, 1910; [7]*Ann. Surg.* Dec. 1909.

FURUNCULOSIS. *E. Graham Little, M.D., F.R.C.P.*

Adamson[1] has a very useful paper, summing up present-day experience on this subject. He remarks that in cases of acute or recent boils one may expect a cure by the use of **Vaccine**, but these are not so useful in chronic conditions. The vaccine to be used is *Staphylococcus aureus*, in doses beginning with 100 million, to be repeated in about four days with 250 million, and increased by 100 million with every injection while the clinical symptoms improve.

For local application he recommends the older practice of painting the early boil with **Collodion**; injecting the boil with a couple of drops of pure **Carbolic Acid**; **Hot Fomentation** with saturated boric dressings, changed every four hours, the parts being washed between the changes with a mercurial antiseptic; also the application of **Glycerin** dressings: a pledget of cotton-wool soaked in carbolic glycerin is applied to the boil, and covered with gutta-percha and a bandage; when the pus discharges, some glycerin is inserted in the central cavity, and a fresh pad of glycerin applied. For internal administration, **Calcium Sulphide** is useful in doses $\frac{1}{10}$ to $\frac{1}{2}$ gr., taken in sugar of milk every hour or every two or three hours; the calcium sulphide must be quite freshly prepared. Yeast (one teaspoonful of fresh brewer's yeast three times a day in water at the beginning of a meal) has been given with results comparable to those produced by vaccine. An investigation of the general health of the patient is specially important, and particularly as regards the detection of albuminuria or diabetes. In indurated chronic boils, **X-ray** treatment may be required to clear up the lesion.

The treatment of *carbuncles* is very similar. The same rules for vaccines apply; surgical measures are more often called for, and will often involve the excision of the entire lesion. Crucial incisions are no longer practised.

Atkinson[2] reports a successful issue by injecting 1¼ million **Autogenous Vaccine** in a child, aged two months, who was very feeble, with much diarrhœa, and boils discharging freely. Six days later a second similar quantity was injected, and the child did well.

REFERENCES.—[1]*Pract.* Oct. 1909; [2]*Lond. Hosp. Gaz.* Mar. 1910.

FURUNCULOSIS, AURAL. (*See* EAR, DISEASES OF.)

GALL BLADDER, SURGERY OF. (*See* BILIARY TRACT.)

GALL-STONES. *Robt. Hutchison, M.D.*

McCracken[1] speaks highly of the results he has obtained from **Eunatrol**—a special preparation of sodium oleate. It is given in 16-gr. doses twice a day. Olive oil enemata should be used at the same time. As a prophylactic it may be administered in 4-gr. doses night and morning; at the same time sugars and starches in the diet should be reduced, and physical exercise insisted upon. Women who are the subject of cholelithiasis should be warned against the use of corsets.

REFERENCE.—[1]*Med. Press*, June 22, 1910.

GANGRENE, DIABETIC. *Priestley Leech, M.D., F.R.C.S.*

Dieulafoy[1] reports a case of diabetic gangrene in a man, aged sixty-four, treated by **Superheated Air.** He used the aero-thermo-generator devised by him, which can be attached to the electric-light wire. It can heat the air to 700° C., and force it out in a strong jet. Hot-air douches were applied at a temperature of 300° C. on the gangrenous parts, and 80° to 100° on the sound parts, for from thirty to forty-five minutes; at the end of the third month, conditions had so improved that amputation could be successfully done. The hot air practically cooked the tissues, keeping the gangrene dry and the tissues mummified. The gangrene was the result of obliterating arteritis in this case.

REFERENCE.—[1]*Presse Méd.* Feb. 16, xviii. No. 14, p. 121.

GANGRENE, EMPHYSEMATOUS. *Priestley Leech, M.D., F.R.C.S.*

In this disease, when due to the *Bacillus aerogenes capsulatus*, Gilpatrick,[1] of Boston, U.S.A., recommends the use of oxygen. In one case, where the infection commenced in an ischiorectal abscess, he stopped the spread of the infection, but the patient succumbed some twelve days later owing to weakness. The method is to make numerous incisions in the affected parts, introduce sterilized soft rubber catheters into the incisions, connect them up to an oxygen generator, and pass oxygen gas through them into the tissues. This method seems worthy of a trial where amputation cannot be done.

REFERENCE.—[1]*Bost. Med. and Surg. Jour.* June 2, 1910.

GASTRIC DIAGNOSIS. *Robt. Hutchison, M.D.*

Stockton[1] has a useful paper epitomizing some of the diagnostic indications furnished by test meals.

The stomach-tube should not be too small; for an adult it should be from 30 to 35 French scale. It should not be too flexible; it should support its own weight held in the upright position for the length of twelve inches without bending. It should have the largest calibre possible without making it liable to bend sharply at an angle when pressed on. A good deal depends on the quality of the rubber; much on the character of the tube. It should have no pumping apparatus connected with it, and should be about 54 inches long.

On the introduction of the tube it is occasionally grasped by the œsophagus about 8 or 10 inches from the teeth. If this delay is temporary, it depends on spasm, and one may expect to find either cardiospasmus or stricture at the cardia.

Finding portions of the test meal returned when the tube has passed about 14 inches, the food being unmixed with gastric juice, is evidence of obstruction of some kind at the cardia, the retention of food in the œsophagus, and probably dilatation of the latter.

If, in pressing the tube onward, it stops at the cardia or, engaging in a spasmodic contraction, is held fast, we may infer the existence of stricture or spasm at the end of the œsophagus.

On passing the tube into the stomach, we usually obtain the best reflow at a distance of from 21 to 22 inches from the teeth, provided the patient is an adult of ordinary stature, having the stomach in position and of normal size. Where the stomach is high, this result may be obtained at 18 inches. In a very tall person, the tube may have to be passed 24 inches or beyond, even when the stomach is in a normal position.

When the tube is passed 20 to 22 inches, we may find stomach contents, and on aspirating this, the tube being pressed further on, after a little resistance, it apparently gets into a second cavity from which stomach contents of different character are removed. This indicates an hour-glass stomach or a spasmodic contraction of the stomach between the second and the last third of the organ; in other words, at the antrum pylori.

When, after passing the tube the usual distance, we find an unusually large amount of the test meal at the proper time, it indicates moderate motor insufficiency of the stomach, which may depend on atony or on some opposition at the pylorus.

If we find a large quantity of the test meal undergoing fermentation, having a "musty" odour, showing a large quantity of bacteria and sarcinæ, and full secretion of HCl, with few lactic acid bacilli, it is indicative of benign obstruction at the pylorus.

If we find stagnating food of foul odour, either with or without free HCl, with lactic acid present, together with the Oppler-Boas bacilli and unchanged or occult blood, it suggests malignancy and obstruction.

The presence of too little of the test meal at the usual time with, however, the presence of gastric juice, suggests over-motor activity.

When we find the stomach empty, or with too little of the test meal present and no gastric juice, it indicates excessive motor activity, probably associated with achylia gastrica (frequently present in pernicious anæmia).

When we find habitually an acidity above 60, depending on HCl, free or combined, the presence of hyperchlorhydria is suggested.

The presence of mucus in excess should always attract attention. Large quantities of glairy, ropy mucus, unmixed with the test meal, indicate œsophageal mucus which has entered the stomach through the irritation occasioned by the passing of the tube. It often occurs when the tube has been introduced in a clumsy manner. It is not indicative of gastritis. Finding a mass of nummular sputa, often accompanied by pus, and by epithelium from the respiratory tract, indicates that the mucus has been swallowed and is not of stomach origin. When mucus is found thoroughly intermixed with the test meal, usually not glairy or ropy, it probably comes from the gastric mucosa, and is indicative of catarrhal gastritis.

Willcox[2] attaches most importance to the amount of "active" hydrochloric acid in the stomach contents, by which he means the free HCl and that combined with proteins and organic bases. The HCl combined with inorganic bases is of no importance. The method employed for the estimation of the active HCl, which has been found the most reliable and most suitable for clinical pathological work, is an adaptation of the Volhard process for estimating chlorides (the modified Volhard-Luttke method). This method is one in which the HCl is directly estimated. It has been tested with solutions of HCl of known strength in the presence of proteins and substances such as those found in gastric contents, and has been found to give extremely accurate results. Two equal portions of gastric contents are taken: to one, pure sodium carbonate is added in excess; both are evaporated to dryness and ignited at a low red heat so as to thoroughly char and decompose the organic matter present. The chlorides in each are then estimated by Volhard's process, in the dishes in which the ignition is done, there being no necessity for any previous filtration before the titration. The difference in the two results gives the amount of active HCl present. The method is very simple and quick. It is well adapted for clinical purposes. There is no risk of loss from volatilization of sodium chloride, since it is quite unnecessary to heat until the ash is white.

Weinstein[3] considers that sufficient importance is not attached to the macroscopic and microscopic appearances of the products of test-meals, and gives a detailed description of these appearances in some common gastric disorders. His paper is a useful protest against an exclusive attention to the chemical side of gastric investigation, but does not lend itself to a summary.

Graham and Guthrie[4] consider that the test meal has a place in

gastric diagnosis, but utter a warning against its "too literal interpretation apart from the clinical history."

Bloch,[5] Groedel,[6] and Bräuning[7] are amongst the increasing number of writers who are occupying themselves with the study of the form and position of the stomach under normal and pathological conditions as determined by the *x*-rays. Bräuning has investigated variations in the tone of the stomach by observing what he terms its method of "unfolding" when a large bismuth meal is rapidly introduced into it whilst the patient stands in front of the fluorescent screen. He finds that hyperchlorhydria and diminution of gastric "tone" usually go together, but that "tone" and "peristalsis" are quite independent; and he has often seen cases in which there was hypotonia of the fundus associated with active peristalsis of the pyloric portion.

T. Lévenet[8] draws attention to the method of determining the outline of the stomach by direct auscultation after the ingestion of an effervescing mixture (30 gr. each of bicarbonate of soda and tartaric acid). The patient should be examined in the erect position, the ear of the examiner being applied directly to the surface of the abdomen. A sizzling sound will be heard over the area of the stomach which is in direct contact with the abdominal wall.

Hutchison,[9] in a paper on differential diagnosis in dyspepsia, points out the importance in the first place of excluding conditions which simulate gastric disorder, but in which the real seat of the disease is not in the stomach itself.

Any of the three leading symptoms of dyspepsia—vomiting, pain, and flatulence—may be misinterpreted by the patient (and his doctor) and be supposed to indicate a primary disorder of the stomach, when in reality the real seat of the disease is somewhere else. It will be sufficient to enumerate some of the chief causes of these symptoms which are liable to be thus misinterpreted.

1. *Vomiting.*—The chief sources of fallacy here are (*a*) Pregnancy, (*b*) Uræmia, (*c*) Chronic intestinal obstruction, (*d*) Disease of the nervous system, *e.g.*, cerebral tumour, incipient meningitis, the gastric crises of tabes, and hysterical or nervous vomiting, (*e*) Phthisis. In all of these conditions gastric symptoms, and especially vomiting, may so predominate as to lead to an erroneous diagnosis of dyspepsia.

2. *Pain.*—The pain of gastric disease may be simulated by that due to (*a*) Gall-stones, (*b*) Chronic appendicitis, (*c*) Mucous colitis, (*d*) Angina pectoris and "abdominal" angina, (*e*) Pleurisy, (*f*) Spinal caries, (*g*) Abdominal aneurysm.

3. *Flatulence.*—The commonest error in this connection is the mistaking of "eructatio nervosa" for flatulent dyspepsia; but flatulence may also be a prominent symptom in cholelithiasis, emphysema, cardiac disease, and angina pectoris, in all of which its significance is easily misinterpreted.

If the possibility of mistake in any of the above directions is present to the mind, it can usually be avoided without much difficulty, but it is important to exclude such conditions at the outset, and to make

sure that the symptoms of which the patient complains are really due to some primary disease or disorder of the stomach. Assuming that this has been done, one has next to enquire: Are the symptoms due to organic or to functional disease?

The distinction of organic from functional conditions is sometimes very easy, but at others it is extremely difficult. In certain cases, indeed, it is only by the process of exclusion, or by watching the results of treatment, that one can feel sure one is dealing with a purely functional disorder. Generally speaking, however, the following symptoms point to organic trouble:—(1) Persistent vomiting, (2) Severe pain, (3) Marked interference with the general health; whereas, conversely, the absence of these is in favour of a functional disorder.

1. Wherever vomiting is a prominent feature in the history, the probability is great that one is dealing with organic disease, for functional disorders either do not produce vomiting at all, or it only occurs as an occasional and inconspicuous feature in their course.

2. Pain, if really severe, is also strongly indicative of organic disease, especially of ulcer. The difficulty here is that patients describe pain so inaccurately, and what is to one a mere ache or discomfort, is spoken of by another as if it were really acute. Usually, however, if the pain be of such severity that the patient has to give up work, lie down, and apply heat to the abdomen, organic disease is present.

3. Decided loss of flesh and strength are also strongly in favour of organic disease, for functional disorders, even when they are of some standing, do not produce these effects, or only do so very gradually.

Having decided that one has probably to deal with a case of organic disease of the stomach, one has next to determine its nature.

1. *Carcinoma.*—A malignant growth in the stomach may be situated either at the cardiac orifice, in the body, or at the pylorus. In the first of these situations it will produce difficulty in swallowing. The presence of an obstruction can be determined by a bougie, and its nature decided by the history and by the exclusion of other possible causes. If at the pylorus, it will result in dilatation of the stomach (*see below*). Growths in the body are those which are most difficult to diagnose.

(*a*). A history of "indigestion," beginning abruptly in a patient (oftenest a man) above the age of forty, and which does not speedily yield to simple treatment, is very suspicious. On the other hand, it must be remembered that in a considerable number of cases the growth starts in an old ulcer, so that a history pointing to this may also be in favour of carcinoma.

(*b*). Steady loss of weight and the early appearance of anæmia, point to malignant growth; but, on the other hand, the absence of these signs, and even a temporary gain in weight under treatment, by no means exclude it.

(*c*). Loss of appetite, and especially a disinclination for meat, are usually early symptoms. Nausea and vomiting supervene later, but are rarely absent altogether. Pain may be present early, and is often more or less constant.

(*d*). A steady diminution in the amount of HCl in the gastric juice, along with the presence of lactic acid and of Oppler-Boas bacilli in the gastric contents, is a conjunction pointing strongly to carcinoma.

It is, therefore, upon a combination of these symptoms and signs that the diagnosis must be based in the early stage (when it is most important to make it). Later, a tumour may be felt below the left costal margin or in the epigastrium; enlarged glands may appear above the left clavicle, although they are exceptional, and there may be signs of secondary growths in the liver. When ulceration has supervened, traces of blood may be found in the gastric contents and "occult blood" in the stools.

In some cases of carcinoma of the body of the stomach, pronounced anæmia is one of the earliest and most striking symptoms. Such cases have to be diagnosed from pernicious anæmia. A blood-count will usually suffice to distinguish them, for in gastric carcinoma the red cells are rarely below 2,000,000 per cmm., whereas in pernicious anæmia they go much lower than that; in pernicious anæmia, also, the colour-index is about 1 or above it; in carcinoma it is less than 1. Megaloblasts are found in the film in pernicious anæmia, but not in carcinoma.

In spite of all that has been said above, the early diagnosis of carcinoma of the stomach is a matter of great difficulty, and it may be justifiable to resort to an exploratory operation in a suspicious case which does not clear up after a few weeks' treatment.

2. *Ulcer*.—The characteristic symptom of ulcer is severe *pain*, which comes on after food, and is relieved by vomiting, which is usually, though not invariably, present. Hæmatemesis is strongly confirmatory, but is often absent. The chief sign of ulcer is a *localized* spot of tenderness on deep pressure.

3. *Gastritis*.—Chronic "gastric catarrh" is certainly diagnosed oftener than it should be, the majority of cases so described being really examples of functional dyspepsia. The symptoms are—loss of appetite, fullness and weight in the epigastrium, *depending greatly upon the kind of food taken*: pain is not a feature of gastritis; nausea is common, and vomiting may occur, but is not usually a prominent symptom. There is no characteristic physical sign, and a diagnosis cannot be made with certainty without the use of the stomach tube. This shows (*a*) diminished total acidity, or even complete absence of gastric juice, (*b*) excess of mucus in the contents, or the presence of mucus on washing out the fasting stomach.

Having determined the presence of gastritis, one has to settle whether it is primary or secondary. Secondary gastritis may occur: (*a*) Where there is disease of the heart causing back-pressure; (*b*) In cirrhosis of the liver; (*c*) In chronic renal disease. If all of these can be excluded, primary gastritis may be diagnosed, and the chief causes of the latter looked for. These are (i) defective or carious teeth and "oral sepsis," (ii) abuse of alcohol or tobacco, or (iii) the taking of irritating or "indigestible" articles of food.

4. *Obstructive Dilatation.*—One has to determine the presence of dilatation, and then to discover its cause. Its presence is determined (*a*) by showing that the stomach is enlarged, and (*b*) by proving the occurrence of stagnation of the contents.

(*a*). Enlargement of the stomach may be inferred when, by percussion, the greater curvature is found to reach below the level of the umbilicus, the lesser curvature being in its normal position. In order to facilitate percussion, it may be necessary to inflate the stomach by making the patient swallow 90 grains of tartaric acid, followed by 120 gr. of bicarbonate of soda. Examination by the *x*-rays after a bismuth meal is of help in obscure cases. It should be specially noted that the presence of splashing is not a certain sign of dilatation, unless it be present some hours after a meal.

(*b*). The occurrence of stagnation of contents is proved by giving the patient an evening meal, preferably containing some easily recognizable food, e.g., currants, and washing out next morning. If food residues are present in the washings, stagnation may be inferred.

The *cause* of dilatation may be either (1) some obstruction at the pylorus, or (2) primary atony of the stomach wall.

In distinguishing between these the history may help. Thus, the occurrence in the past of symptoms of ulcer points to a cicatricial stenosis of the pylorus. If visible peristaltic waves are seen, one may be sure of the existence of an obstruction. These can sometimes be elicited by massaging the stomach, or by flicking the surface of the abdomen with a wet towel. The presence of actual stagnation of the contents, too, is strongly in favour of obstruction, as this rarely (if ever) occurs in cases of atonic dilatation. Copious vomiting also points to obstruction, as it is exceptional to meet with this symptom in atony.

Assuming that obstructive dilatation has been diagnosed, one has next to determine its cause. Here one has to distinguish between *benign and malignant obstruction.* The existence of a history of signs and symptoms of ulcer (see above) point to the former; the general symptoms of carcinoma to the latter. A tumour may be felt in either case. Examination of the stomach contents also helps in the differential diagnosis. The presence of abundance of free HCl, with sarcinæ and yeasts, points to benign stenosis; diminution or absence of HCl, with the presence of lactic acid and Oppler-Boas bacilli, to malignancy.

One has further to distinguish dilatation from (1) Gastroptosis, and (2) Hour-glass stomach.

1. In *Gastroptosis,* percussion (if necessary after inflation) will show that the lesser curvature is displaced downwards as well as the greater, but the normal distance between the two curvatures—about four inches—is preserved. In the great majority of cases of gastroptosis the right kidney is more or less freely movable, and this affords confirmatory evidence. The *x*-rays may also be of help.

2. *Hour-glass stomach* may be diagnosed by the following signs :—(*a*) If the stomach be washed out with a known quantity of fluid,

e.g., 30 oz., it will be found that some has been lost, e.g., 6 oz., when the return fluid is measured. Some of the fluid seems to disappear, in fact, as if it had flowed through a hole. (*b*) If the stomach be washed clean and the tube passed a few minutes later, several ounces of fermenting liquid may be obtained which have escaped from the pyloric pouch. (*c*) If the stomach be drained apparently dry, a splash can still be obtained over the pyloric end ("paradoxical dilatation"). (*d*) If the stomach resonance be carefully percussed out, and it be then inflated with tartaric acid and soda, as described above, then again percussed, it will be found that a great increase in resonance has occurred at the cardiac end only. If the abdomen be watched a little, the pyloric pouch may sometimes be seen gradually to fill and become prominent. A loud gushing sound can also be distinguished on listening with the stethoscope over the site of the opening between the two pouches.

Assuming that all the above forms of organic disease can be excluded, one may conclude that the case is one of functional dyspepsia.

The next task is to determine what particular variety of functional disorder one has to deal with. One is met at the outset by the difficulty of classifying the functional disorders of the stomach. Three forms of classification may be adopted:—(1) *Physiological*, (2) *Clinical*, (3) *Etiological*.

1. *Physiological.*—In this classification, cases of functional dyspepsia are arranged according to the particular function or functions affected, thus:—

(*a*). Affections of secretion: (i) excess = hypersecretion and hyperchlorhydria; (ii) defect = achylia and hypochlorhydria.

(*b*). Affections of motility: (i) excess = ? pyloric spasm; (ii) defect = atony or impaired motility.

(*c*). Affections of sensation: Excess = hyperæsthesia or gastralgia.

Any of these may be present alone, or two or more may exist in conjunction.

The above is undoubtedly the most scientific method of making a differential diagnosis in cases of functional dyspepsia, but it has the inconvenience of necessitating the use of test meals.

2. *Clinical.*—Clinically, cases of functional dyspepsia may be classified according to their symptoms into certain rough groups, thus:—

(*a*). Hypersthenic dyspepsia. This is probably due to a combination of hypersecretion and hyperæsthesia. The patient is usually a young man, otherwise healthy, and the chief symptom is pain in the late period of digestion, which is relieved by food. Vomiting is absent.

(*b*). Asthenic dyspepsia. This is due to impaired motility (atony), with or without some disorder of secretion. The patient may be of either sex and of any age, and the chief symptoms are flatulence, and fullness after meals. It is often present along with gastroptosis (especially in women), and there may be atonic dilatation of the stomach (*see above*).

(*c*). Acid dyspepsia. This is an ill-defined group in which the chief symptom is a sensation of acidity or the presence of acid eructations. Some cases are really examples of hyperchlorhydria, with or without the presence of gastritis. In others the cause is the production of organic acids by fermentation. Diagnosis can only be made by aid of the stomach tube.

Other clinical forms of dyspepsia are also described, e.g., "senile" dyspepsia (essentially a hypochylia), "gouty" dyspepsia (the same as the "acid" form), "flatulent" dyspepsia (usually due to defective motility), "nervous" dyspepsia (in which no functional disorder can be discovered at all), and others; but the use of such terms is inaccurate, and should be avoided as far as possible.

3. *Etiological.* — Instead of attempting to distinguish between different forms of functional dyspepsia, one can regard it as an aggregation of symptoms of gastric disorder, excited by different causes, and classify cases according to the particular exciting cause at work. This method is simple and convenient, and is also useful for purposes of treatment. Adopting it, one may say that functional dyspepsia may be induced by: (*a*) Dietetic causes, e.g., unsuitable food, hasty meals, the abuse of alcohol, tea, etc.; (*b*) Physical causes, e.g., imperfect chewing, defective teeth, oral sepsis, constipation, over fatigue, deficient exercise, etc.; (*c*) Mental causes, e.g., overwork, a studious life, etc.; (*d*) Emotional causes, e.g., shock, worry, etc.

Any one of the above ways of looking at the subject is useful, the essential point being that a classification of some sort should be adopted. Probably a combination of the first and third methods, which takes into account both the particular disorder which is present as well as the cause which has brought it about, will lead to the best treatment.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Dec. 11, 1909; [2]*Lancet*, Ap. 23, 1910; [3]*Jour. Amer. Med. Assoc.* Nov. 20, 1909; [4]*N.Y. Med. Jour.* Sept. 4, 1909; [5]*Berl. klin. Woch.* Ap. 18, 1910; [6]*Deut. med. Woch.* Ap. 14, 1910; [7]*Münch. med. Woch.* Ap. 5, 1910; [8]*Lyon Méd.* Aug. 15, 1909 (abst. in *Sem. Méd.* Oct. 30, 1909); [9]*Pract.* June, 1910.

GASTRIC ULCER.

Aluminium Silicate (Neutralon) in the treatment of (*page* 6).

GASTROSTAXIS. *Robt. Hutchison, M.D.*

It will be remembered that the above title was introduced by Hale White[1] to describe cases of oozing of blood from the mucous membrane of the stomach in which no ulcer could be demonstrated either at operation or autopsy. The terms gastrorrhexis, hæmatemesis puellaris, and hæmorrhagic gastralgia have also been applied to it. Some discussion has recently taken place[2] as to whether gastrostaxis is really to be regarded as an independent disease; and Bolton[3] is inclined to consider most of the cases so designated as being in reality examples of acute ulceration. In support of this view, he points out that an acute ulcer of the stomach may be so small as to be easily

overlooked at operation or even on the post-mortem table. He concludes from his observations that the separate existence of gastrostaxis has not yet been conclusively proved, whilst acute gastric ulcer is a most important and very common malady which deserves more consideration than has yet been given to it. Hale White,[4] replying to the above criticisms, reiterates his belief in the existence of gastrostaxis, and cites cases in which no ulcer was found on careful examination of the stomach. To this Bolton[5] rejoins that no post-mortem evidence is of value unless the mucous membrane of the stomach was examined microscopically.

Sutherland,[6] who believes in the existence of gastrostaxis, mentions some of the points which distinguish it from gastric ulcer. These are as follows: The vast majority of cases of gastrostaxis occur in women; wasting, and the cachexia which accompany organic disease of the stomach, are usually absent; the attacks of hæmorrhage occur at long intervals, with freedom from symptoms between; pain is less than in gastric ulcer; and improvement under treatment takes place much more quickly. He finds that the occurrence of the hæmorrhage often coincides with the menstrual period, and believes that there is some connection between the two.

It may be pointed out that Sutherland's arguments leave the main question untouched, for the features which he believes distinguish gastrostaxis may quite as well be regarded as characterizing acute ulceration of the stomach as opposed to chronic ulcer, and no doubt this would be the point of view of those who deny that gastrostaxis exists.

References.—[1]*Lancet*, Nov. 3, 1906; [2]*Brit. Med. Jour.* May 21 and 28, and June 4, 1910; [3]*Ibid.* May 21, 1910; [4]*Ibid.* June 4, 1910; [5]*Ibid.* June 11, 1910; [6]*Pract.* Ap. 1910.

GENERAL PARALYSIS OF THE INSANE. (*See* Mental Diseases.)
Soamin in (*page* 13).

GLANDERS. *E. W. Goodall, M.D.*

Zieler[1] reports a case of chronic glanders in which apparent recovery took place in consequence of the injection of dead cultures of the bacillus of glanders. The patient was a man, aged forty, who had suffered for six years. There was extensive destruction of the palate and nose. A **Vaccine** was prepared of which each cubic centimetre contained a normal loopful of a 48-hour glycerin-agar culture of *B. mallei* in physiological salt solution. An injection was given on two consecutive days, and then again on two days after an interval of six or eight days. Rapid recovery ensued after the treatment had been carried out for a fortnight. Two months after the beginning of the treatment the patient was well. It is pointed out that, though it was possible a relapse might occur, this method of treatment had been more satisfactory than any previously employed in the case.

Reference.—[1]*Wien. med. Klin.* May 5, 1909, in *Brit. Med. Jour.* Epit. Nov. 13, 1909.

GLANDULAR FEVER. *E. W. Goodall, M.D.*

Nine cases of this disease have been described by Burns.[1] The first six occurred amongst children in a ward of a children's hospital, the last three amongst adults of the family to which one of the affected children belonged. The first of these three cases occurred twenty-four hours after the arrival home of the affected child. As none of the family had seen this child for more than two months upon its return home, it appears as if the incubation period might be as short as twenty-four hours. There was nothing unusual about the cases.

REFERENCE.—[1]*Arch. Int. Med.* Aug. 15, 1909, in *Brit. Med. Jour.* Epit. Nov. 27, 1909.

GLAUCOMA. *A. Hugh Thompson, M.D.*

Acute Glaucoma.—Few diseases of the eye respond so readily to proper treatment as this, and none show more rapidly and disastrously the effects of improper treatment. The disease consists essentially in an increase in intra-ocular tension due to a blockage of the channels by which the intra-ocular fluid normally escapes. If the blockage is very rapid, the effects of pressure on the sensitive nervous structures of the eye is correspondingly acute. Not only is sight reduced to a minimum, but there is very acute pain. The pain causes severe prostration, attended not seldom by vomiting. The stasis in the intra-ocular circulation is attended by deep circumcorneal congestion, by haziness of the cornea, and by dilatation of the pupil. This last sign is most important, for acute glaucoma being an emergency illness is practically always a disease for the general practitioner to deal with in the first instance. It needs considerable practice to be able to estimate the intra-ocular tension by digital pressure; and as iritis is a commoner disease than glaucoma, and as this pain and circumcorneal injection are equally characteristic of iritis, the great danger which patients with acute glaucoma run is to have atropine inserted into their eyes by an ignorant practitioner, which would be absolutely certain to intensify their trouble. If, at the same time, the pain is masked by an opiate, the case may very easily go on to complete blindness. Now a dilated pupil never occurs in an untreated case of iritis, and should therefore be an absolute contraindication to the use of atropine. Occurring with the other symptoms already mentioned, and, especially if the anterior chamber is unusually shallow, it is itself diagnostic of acute glaucoma.

TREATMENT.—As to this there can be no doubt. Immediately the diagnosis is made, **Eserine** should be instilled (1 per cent drops of eserine sulphate) with the object of producing a contraction of the pupil. If this is successful, the angle of the anterior chamber is at once widened, and the normal intra-ocular circulation—which depends upon a current from the anterior chamber to the extra-ocular lymph spaces *viâ* the spaces of Fontana—is to some extent restored. If, at the same time, a purgative is administered and a couple of leeches are applied to the temple, the congestion will be diminished, and the patient put into the

best possible condition for operation. In case these measures are not successful, the operation of **Iridectomy** must be performed without delay, and in that case a general anæsthetic will be necessary. Where the preliminary measures are successful in alleviating the symptoms, iridectomy must still be performed within a few days, and in this case cocaine will generally be a sufficient anæsthetic. The effect of the iridectomy, which must be a large one, and include the whole width of the iris up to its ciliary attachment, is to secure that, so far as the iridectomy extends, the angle of the anterior chamber is kept permanently open. Such is the orthodox teaching about acute glaucoma, and up to the present it is generally admitted to be justified by the results of the operation.

Chronic Glaucoma, although essentially the same disease in a chronic form, presents far greater difficulties. Its pathology is the same in so far as it consists in a state of unduly high intra-ocular tension, caused by a blockage in the drainage system in the angle of the anterior chamber; but while in the case of the acute disease the blockage has often only been present for a comparatively short time, so that secondary changes have had no time to take place—and if the cause of blockage is removed the disease is in this way curable—in the case of the chronic disease secondary changes have practically always occurred, and the operation which is sufficient to cure the acute condition may fail to cure the chronic one. About the diagnosis of chronic glaucoma, a good deal has been written in recent volumes of the *Medical Annual*, and it will be enough here to point out that the rise in intra-ocular tension may be intermittent, and therefore by no means easy to determine; that the dilated pupil, and even the shallow anterior chamber, may or may not be present; that the cupping of the optic disc visible with the ophthalmoscope is a sure sign of long-continued high tension, but it is a sign of already advanced glaucoma, and no case ought to be allowed to wait for a diagnosis until this sign is evident; and that the one certain sign of an early condition of chronic glaucoma is a commencing contraction of the visual field, generally commencing on the nasal side of the periphery, accompanied or preceded by an enlargement of the blind spot, so that a paracentral scotoma is formed. (Cf. *Medical Annual*, 1910.)

Treatment.—It is generally admitted that the benefit of iridectomy, though in most cases undoubted, and in some cases lasting, is yet in too many merely temporary. According to Thomson Henderson, the reason is that the so-called ligamentum pectinatum, or fibres which surround the spaces of Fontana, undergo a process of sclerosis which renders filtration through the angle of the anterior chamber impossible, however open that angle may be. According to him, the benefits, such as they are, of iridectomy, are to be attributed to the opening up of fresh crypts in the cut surface of the iris itself. According to others, they are to be attributed rather to the formation of a subconjunctival fistula by the way of the corneo-scleral incision which forms a part of every iridectomy operation. This would

naturally lead to a revival of the operation of sclerotomy; but the effects of this, as a rule, were no more permanent than those of iridectomy, the reason evidently being, that after a time a scar is formed at the site of the scleral incision, which is no more permeable to fluid than the rest of the sclera. In some cases a firm scar is not formed, and these are the cases where a sclerotomy (or iridectomy) does effect a permanent cure. They can be detected, says Col. Herbert, by the persistence of a slight subconjunctival œdema over the seat of the scleral incision, which is rendered more apparent by pressure for a short time on any part of the eyeball. These cases of permeable cicatrix generally result from an operation in which the scleral incision was more or less jagged. To obtain the same effect systematically by a small *sclerectomy* has been the aim of several ophthalmic surgeons in recent years, i.e., the removal or isolation of a small portion of sclera, sufficient to ensure the permanence of a channel between the anterior chamber and subconjunctival tissue.

Of these newer operations, that of Lagrange, figured in the *Medical Annual* for 1908, consists in making the scleral incision with a Graefe knife, so oblique that when it is completed there is a tapering portion of sclera remaining attached to the upper margin of the cornea, which is cut away with scissors. It is an operation not easy to perform. Herbert's "wedge" operation, described in the *Medical Annual* for 1909, has now been simplified by him. It is performed with a small iridectomy knife with which a very oblique scleral incision is made. Instead of excising the anterior lip, as Lagrange does, he finds it sufficient to make a vertical cut down as far as the cornea at each edge of it, with a specially devised knife. This is said effectually to prevent the subsequent cicatrization of the two scleral surfaces. A small iridectomy may or may not be performed, not with the object of opening up the anterior chamber, but merely in order to guard against a prolapse, and for this purpose a small button-hole near the ciliary margin is sufficient.

The third of these newer operations for glaucoma is that of trephining the sclera, which has been independently advocated by Elliot, of Madras,[1] and Fergus, of Glasgow.[2] A very successful case was recently on view at the Oxford Ophthalmological Congress. A Bowman's corneal trephine with a cutting diameter of 2 or 2·5 mm. is generally used. It is important that a clean conjunctival flap be first made, and the trephine hole should be immediately outside the corneo-scleral margin. A small iridectomy may be done to prevent prolapse, as in Herbert's operation. Elliot has operated on 128 eyes in this way, suffering from both acute and chronic glaucoma. In all but four the tension was brought down after the primary operation; in about half his cases he found it necessary to perform a small iridectomy to prevent prolapse. In four cases a secondary trephining was called for, and in two a secondary operation to remove iris which had prolapsed into the subconjunctival space.

By one or other of these methods it would certainly seem that

sclerectomy is destined to have a permanent position as an operation for chronic glaucoma. In acute cases there seems no reason to be dissatisfied with the older operation of iridectomy. It may be added that according to Thomson Henderson, whose theory of glaucoma was summarized in the *Medical Annual* for 1909, sclerectomy can do no good, as there can be no such thing as a permeable cicatrix. The corneal epithelium, he says, always relines the inner margins of all incisions into the anterior chamber, and so effectually precludes filtration.[3]

His recently published book gives a very clear account of his views on the whole subject which, being based on a vast amount of anatomical research, merit consideration, however much they run counter to current conceptions. His chief points are : (1) That the eye, like the cranium, is a non-distensible cavity, and that the intra-ocular tension must therefore depend, not on variations in total volume which cannot occur, but on variations in blood-pressure. Hence the exciting cause of primary glaucoma is always a rise in intravenous blood-pressure. (2) In normal individuals Schlemm's canal and its numerous venous connections form an efficient drainage system by which the aqueous is absorbed in greater or less quantity according to the normal variations of intravenous blood-pressure within the eye. In those predisposed to glaucoma, the sclerosis of the cribriform (so-called " pectinate ") ligament obstructs the access to Schlemm's canal. (3) The retention of the aqueous converts the intra-ocular veins from distensible into rigid tubes, the pressure being increased both within and without the vessels. Hence pressure symptoms within the globe and congestion of the ciliary vessels. (4) The occlusion of the angle of the anterior chamber which occurs in some, but not all cases, is purely a secondary phenomenon and not a true cause of glaucoma. (5) The chief alternative route for the exit of aqueous when the normal one is closed is by means of the crypts of the iris. The cut surface of a healthy iris does not cicatrize. Hence the efficiency of iridectomy in cases of acute glaucoma where the iris tissue has not had time to degenerate, and its comparative inefficiency in chronic cases where it has.

References.—[1]*Ophthalmoscope*, Dec. 1909 ; [2]*Ibid.* Feb. 1910 ; [3]*Glaucoma* (Arnold, 1910).

GONORRHŒA. *C. F. Marshall, M.Sc., M.D., F.R.C.S.*

Miles[1] reports good results from the treatment of acute gonorrhœal urethritis by **Passive Hyperæmia.** The apparatus employed consists of a glass cylinder 7 inches long and 2 inches in diameter, closed at one end, with a lateral tube near the blind end, connected with an air pump by a rubber tube with clamp. A rubber flange is fitted closely to the open end of the cylinder. After the patient has passed water, the flange is applied to the root of the penis and kept closely adherent by means of an elastic band. The cylinder is then placed over the penis and connected with the rubber flange. Three or four strokes of the piston produce sufficient vacuum. If pain is caused, the vacuum

is excessive, and air must be admitted by relaxing the clamp. The apparatus is applied daily for two or three periods of ten to fifteen minutes, with intervals of five minutes between the applications. The penis becomes swollen and bluish. The passive hyperæmia causes an increase in the phagocytes and in the number of gonococci ingested by these cells. The author has treated over 300 cases of acute anterior urethritis by this method. In a few cases the discharge ceased after three or four applications, but in others it continued for three or four weeks. The chief advantage claimed for the method is the almost complete absence of complications; posterior urethritis was rare and never severe, and there were only two cases of epidymitis and two of arthritis. During the first year no internal treatment was adopted, but afterwards the balsams and alkaline mixtures were given. The difference in results was not striking, but internal treatment appeared to be somewhat advantageous.

Schindler[2] recommends **Atropine** as an auxiliary medication in the treatment of gonorrhœa. He states that the sexual organs, especially the vasa deferentia and vesiculæ seminales, possess automatic movements of a retrograde character, depending on the presence of a peripheral nerve centre situated in the hypogastric plexus. The existence of these automatic movements can be demonstrated by excising the sexual organs of an animal, together with the hypogastric plexus, and placing them in a nutrient medium. These automatic movements are paralyzed by a 1 per cent solution of atropine; hence the idea of using atropine in cases of gonorrhœa, the object being to prevent the retrograde movements which assist the gonococci to spread to the epididymis, etc. The atropine is administered in the form of suppositories containing 0·001 gram twice daily. If posterior urethritis is present, an instillation of some antiseptic fluid may be made, containing 1 ccm. of a 1–1000 solution of atropine sulphate. The colliculus seminalis and the prostate are thus more directly acted upon than they can be per rectum. Atropine may also be given subcutaneously, the doses not exceeding 3 mgrams daily. No bad effects are said to occur, except occasional dryness of the throat; systematic atropinization of an organ for a week is said to be free from danger. Schindler warns against the instillation of strong solutions of silver nitrate into the urethra, as they set up reflex movements in the genital tract and drive the gonococci into fresh parts of the mucous membrane. For this reason he uses **Protargol** instead of silver nitrate, for instillations or deep injections into the posterior urethra. In cases of acute posterior urethritis he injects one or two syringefuls of a $\frac{1}{4}$ or $\frac{1}{2}$ per cent solution of protargol with 1 per cent solution of cocaine. Care must be taken in the preparation of the protargol solution, which must not be rubbed up with glycerin nor dissolved in it, as this causes smarting; the protargol should be dusted on cold water and allowed to dissolve: this takes from half an hour to an hour. The introduction of a Guyon's catheter is said not to provoke retrograde contractions of the vasa deferentia; but a catheter can be dispensed with by employing Janet's

method of irrigation, with the protargol solution. According to Schindler, Janet's method of irrigation only causes irritation when the fluid pressure is too great, or the solution too strong, or the temperature unsuitable. However, during the acute stage of posterior urethritis, both methods may be replaced by the gonorrhœa syringe, as the compressor muscle at this stage is almost always flaccid and permeable without much pressure. By this means the patient can be taught to inject the posterior urethra himself. With regard to **Massage of the Prostate,** Schindler considers this contraindicated in cases of acute or subacute gonorrhœa, as the mechanical stimulation of the gland sets up retrograde movements in the vasa deferentia which may lead to epididymitis; also, gonococci which are localized become diffused through the whole prostate, not only by the massage, but by automatic movements of aspiration on the part of the colliculus seminalis. On the other hand, in chronic gonorrhœa, and before giving permission to marry, repeated expression of the prostate, to test the secretion for gonococci, is indispensable.

De Santos Saxe[3] draws attention to the *persistence of the gonococcus in the prostate,* in cases of chronic gonorrhœa. To determine whether gonococci are present in the prostate, the latter must be massaged after previous irrigation of the urethra to remove any pus or gonococci which might be present in the latter. If no gonococci are found after this procedure, they may sometimes be made to emerge from their hiding-places by the method of "provocation" or "bacteriotaxis." For this purpose 15 drops of a 1 per cent solution of silver nitrate are injected into the urethra twenty-four to forty-eight hours before massage of the prostate. In 150 cases of chronic gonorrhœa, from six months to eighteen years in duration, 60 per cent showed prostatitis; the older the infection, the more frequent was the prostatitis. Of the 108 cases of gonorrhœal prostatitis, 31 showed gonococci in the prostatic secretion. The older the infection, the more scanty the gonococci; after three years they were rarely found, but many examinations are necessary to prove their absence. Mixed infection occurred in 86 per cent of the cases; the older the case the more common was mixed infection. The cases of mixed infection included staphylococci in 74 per cent, bacilli in 28 per cent, Gram-positive diplococci in 10 per cent, streptococci in 7 per cent. The gonococcus was present alone in only 5 out of the 108 cases, and these were all of less than a year's duration. The necessity for microscopical examination of prostatic secretion was shown by the frequent absence of clinical signs and the presence of clear urine. The author prefers a double stain of eosin and methylene blue in methyl alcohol. Gram's stain is essential, but misleading unless properly applied. Cultures are often unsuccessful. Consent to marriage should not be given until all methods of examination have been exhausted.

Wolbarst[4] concludes that the gonococci may persist in the prostate for many years and give rise to no symptoms; that they may not necessarily be infectious; that the presence of gonococci in the prostate

can only be shown by repeated examinations of the secretion obtained by massage of the prostate after " provocation " by silver nitrate, etc. ; that the risk of exciting further inflammation, by stirring up the gonococci by the above methods, is a less evil than leaving them alone to be stirred up after marriage, and so cause infection of the wife.

Sir Wm. Gowers[5] gives a clinical lecture on a case of double *retro-ocular neuritis and myelitis* in a male, which he attributes to gonorrhœal infection. The retro-ocular neuritis began about two months after an attack of gonorrhœa. Paraplegia, accompanied by anæsthesia and retention of urine, began about two months later, and was complete in a week. Treatment by antigonococcus serum had no effect, neither had injections of succinamide of mercury, which were given in case there was syphilis. The Wassermann test, however, was negative. Sir Wm. Gowers thinks some improvement might have been effected if the antigonococcus serum had been used earlier.

W. Murrell,[6] in describing cases of *gonorrhœal septicæmia*, draws attention to several important points. In the first place, the infection is often a mixed one, due to the presence of the *Staphylococcus pyogenes* or the *Diplococcoccus urethræ communis*. Secondly, the ideas that the knee-joint is most often affected, and that the disease is more common in men, are erroneous. The hip, wrist, elbow, shoulder, and hand are affected as often as the knee, and just as many cases occur in women as in men. Affection of the sterno-clavicular joint is common in gonorrhœal septicæmia, but not in rheumatism. Gonococcic iritis and sclerotitis are not uncommon complications, and occur usually about the same time as the arthritis. Murrell states that many cases of arteritis and atheroma of the aorta can be traced to gonococcal infection. As regards treatment, he obtained better results from **Antigonococcic Vaccine** than from antigonococcic serum. Gradually increasing doses were given, usually from five to ten millions of cocci, but in one case up to 200 millions. In one case ankylosis of the wrist ensued in spite of this treatment, and the joint subsequently became tuberculous. This case illustrates the intimate relation between gonococcic arthritis and tuberculosis. In some cases of gonorrhœa, tubercle bacilli have been found in the discharge ; this probably explains some cases of genito-urinary tuberculosis. (*See also page* 58.)

Salter[7] describes a case of recurrent purulent gonorrhœal urethritis which rapidly improved after three rectal injections of 10 cc. of polyvalent **Antistreptococcus Serum** on successive days. The purulent discharge ceased for two weeks, then recurred slightly, but was reduced to a slight mucoid discharge after three more injections at intervals of two days. As regards the way in which the serum acts, Salter points out that this cannot be explained by Ehrlich's theory of the opposition to each infection of a specific antibody, and is of opinion that the serum acts by raising the power of resistance of the tissues.

Bolton Bangs,[8] in reviewing modern progress in the treatment of gonorrhœa, comes to the conclusion that the average duration of

uncomplicated cases is still from four to six weeks, but that the albuminoid salts of silver, if used in the early stages, often modify the disease and lessen the liability to complications. He prefers hand injections to irrigation in acute gonorrhœa. He considers that irrigations do not shorten or mitigate the attack, and that posterior urethritis is more frequent with irrigations than with injections. In chronic gonorrhœa, irrigations may be useful, but only in exceptional cases.

Gonorrhœa in Women.—Whitehouse,[9] writing on the diagnosis and treatment of gonorrhœa in the female, wisely remarks that "the prophylaxis of pyosalpinx, chronic salpingitis, chronic perimetritis, and allied conditions lies largely in the proper diagnosis and thorough treatment of every case of gonorrhœa." He points out that the chief sites of gonococcal infection in women are: (1) The cervix uteri; (2) Bartholin's ducts (the gland is usually not affected); (3) The urethra, especially the ducts of two small glands in the floor of the urethra known as "Skene's tubules;" (4) The follicles about the fossa navicularis and labia minora; (5) The vagina in children, less often in adults. Pus obtained from one or other of these situations is stained by Gram's method and by Pappenheim's stain. The latter consists of methyl green ·15 gram, pyronin ·25 gram, alcohol 2·5 cc., glycerin 20 cc., phenol in water, 2 per cent, 100 cc.; films are stained in this solution for four minutes, washed in water, dried, and examined under $\frac{1}{12}$ oil immersion; the cocci are stained red and the cell nuclei blue. For cultivation of the gonococcus, the author uses ordinary agar, with the addition of human blood serum and a few drops of human urine. Although isolation of the gonococci by culture is not easy, culture media afford a means of distinguishing "pseudo-gonococci" from the true gonococcus. Five diplococci have been described as occurring in the female genital tract besides the gonococcus; they closely resemble the latter in microscopical appearance and staining reactions, but they all differ from it in growing upon and liquefying gelatin.

Treatment.—The author has little faith in internal drugs, such as the balsams, helmitol, etc., but has found some benefit from **Methylene Blue and Iodide of Mercury.** As regards local treatment, he points out that vaginal irrigation with strong germicidal drugs often does more harm than good, and it cannot reach the cocci which are buried in the gland ducts of the cervix, urethra, and vulva. Of the new silver salts he thinks **Argyrol** the best and the least irritating; but he prefers local treatment by applying a culture of the **Lactic Acid Bacillus,** which apparently has an inhibitory action on the growth of the gonococcus. After sponging away all pus, a 24-hour virulent broth culture of the bacilli, together with a powdered tabloid of "lactobacilline" and a little lactose, are applied to the diseased surfaces every three or four days for a fortnight, and the bacilli are then removed by a few days' douching with permanganate solution. First of all there is an increase in the discharge, but in a week or two this

becomes less purulent, and finally ceases. Chronic cervical gonorrhœa may also be treated by **Yeast,** which destroys the gonococci. The yeast is applied in the form of bougies containing asparagin as a nutrient medium. Whitehouse thinks that **Vaccine Therapy** is the most useful weapon in the treatment of gonorrhœa. The preparation of an autogenous vaccine takes much time and trouble, but, as Eyre and Stewart[10] have shown, an autogenous vaccine is not necessary, for almost equally good results can be obtained by using a stock vaccine comprising a dozen different strains. Whitehouse employs both forms of vaccine, starting with an injection of five million cocci from a standard vaccine while he prepares an autogenous mixed vaccine from pus from the cervix, urethra, and Bartholin's ducts ; this is injected after an interval of forty-eight hours to avoid the " negative phase." The doses should never exceed five million cocci, for, as Eyre and Stewart have pointed out, small doses serve both to raise and steady the opsonic index to the gonococcus, and an index just above normal is most favourable for recovery. Formerly, large doses of cocci, up to 100 million, were given ; which resulted in a prolonged negative phase ; this is avoided by small doses. Moreover, as the length of the negative phase is known roughly, it is not necessary continually to regulate the time of injection by estimating the opsonic index.

Lochrane[11] recommends the following treatment : vaginal douching with biniodide solution 1–4000 ; application of a 20 per cent solution of **Argyrol** to Skene's tubules and Bartholin's ducts, by means of cotton-wool probe or syringe ; application of the same solution to the cervix, followed by insertion of a bougie of fresh German **Yeast** into the cervical canal, together with a little cane sugar to promote the action of the yeast. This is repeated every other day for ten days. If the disease has not spread to the uterine cavity, this treatment is often sufficient. If, however, the uterus is affected, the cavity is swabbed out with a 10 per cent solution of argyrol on alternate days, the strength of the solution being gradually increased. If the discharge from the uterus still continues, the question of curetting arises ; but the danger of causing extension of the disease by meddlesome treatment should be borne in mind. After curetting, the uterine cavity should be swabbed with pure carbolic acid or a 20 per cent solution of argyrol. In cases which are not improved by the above treatment, the author advises palliative measures, such as **Vaginal Suppositories** of tannin and boric acid. In cases of acute salpingitis, pyosalpinx, or pelvic peritonitis, operation is contraindicated as a rule ; but in chronic gonorrhœa of the tubes and peritoneum, operation offers the best hope of eradicating the disease, although neurasthenia, which is often present, may be aggravated thereby : the choice is then between two evils.

Watson[12] recommends the treatment of gonorrhœal and mixed infections of the female genital tract with **Lactic-acid Bacilli.** He uses a preparation obtained by filtering " sauerkultur " made from skimmed milk. Casein is separated, and the filtrate contains numerous

lactic-acid bacilli, together with lactose, lactalbumin, and salts. The solution can be strengthened by adding sugar of milk or a powdered tablet of lactic-acid bacilli. After disinfecting the parts, all traces of the disinfectant are removed and the lactic fluid is introduced into the vagina. In some cases, the secretion is said to become normal in a few days; in others, after treatment has been repeated weekly for two or three weeks. Watson considers that the lactic-acid bacilli act as a substitute for the bacillus of Doderlein, which is the supposed protector of the vagina.

Non-specific Urethritis.—Hume[13] draws attention to a form of non-specific urethritis, which he regards as a clinical entity distinct from all forms of gonorrhœal or post-gonorrhœal urethritis, from urethritis due to mechanical or chemical irritation, from urethritis ab ingestis, and from all forms of diathetic urethritis and urethritis due to infective processes. He describes two general types of non-specific urethritis: (1) An acute form, following sexual connection after a regular incubation period, running a well-marked clinical course and amenable to treatment; (2) A chronic form, occurring apart from sexual connection, with no definite incubation period, and rebellious to treatment. He designates the first type sexual or infective, the second type auto-infective. The first type is not common; it resembles gonorrhœal urethritis, but has a longer incubation period and is milder in character. The infecting organism was studied in 11 cases of this type: in 5 cases Gram-positive cocci alone were found; in 5 cases bacilli alone, 4 Gram-positive, 1 Gram-negative; in 1 case both cocci and bacilli were present. The coccus was usually the *Staphylococcus albus*; the Gram-negative bacillus, the *Bacillus coli*; the Gram-positive bacillus was not identified. The prognosis of this form of urethritis is good. The author considers that many so-called gonorrhœas which are cured by a few injections are really cases of this type. The best treatment is by injection of **Silver Nitrate** $\frac{1}{12}$ to $\frac{1}{8}$ per cent, combined with daily irrigation with permanganate of potassium. In the declining stage the silver nitrate is replaced by **Astringent Injections.** The average duration of treatment is from three to four weeks. The second, or auto-infective type, appears often to be due to the presence of a long foreskin, which produces urethral congestion in early life and favours moisture and germ growth. In this type there is a gradual development of chronic urethral infiltration. This form is much more common than the preceding, or sexual form, and is of much less favourable prognosis. The treatment recommended includes **Circumcision, Massage** of the prostate, followed by **Intravesical Irrigations** and **Hot Rectal Douches,** if the prostate is involved (which is said to be often); **Dilatation of the Urethra,** combined with urethral irrigation; injections of **Silver Nitrate** $\frac{1}{4}$ to $\frac{1}{2}$ per cent. These cases often relapse after apparent cure, and are liable to lead to neurasthenia. Hume considers that the presence of pre-existing urethral changes caused by non-specific urethritis explains the variation and chronicity of many cases of gonorrhœa; also that the existence of chronic non-specific urethritis may explain

the origin of many cases of obscure prostatic or vesicular infection. He recommends **Circumcision** as a prophylactic measure.

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GOUT.

(*Vol.* 1910, *pp.* 31, 348)—Local applications of **Guaiacol** (20 per cent solution in olive oil) give relief to pain. **Thyminic Acid** (solurol) in doses up to 5 gr. three times daily is of value given internally, also **Colchicine** gr. $\frac{1}{100}$ to $\frac{1}{32}$, or **Colchisal** gr. $\frac{1}{60}$.

GOUT, CHRONIC.

Thiosinamine in (*page* 54).

HÆMATOLOGY.

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Alkalinity of Blood.—Boycott and Chisolm[1] point out that the colour of the indicator may vary materially with the presence or absence of protein. In the presence of protein the end point is not sharply defined. The authors therefore suggest a precipitate reaction. A series of small test-tubes are prepared containing quantities of N/1000 sulphuric acid, rising by 0·1 cc. from 0·0 to 1·2 cc., the total volume of liquid in each being made up to 2 cc. with distilled water. Each tube then receives a drop (*circa* 0·02 cc.) of blood ; the contents are mixed, and the tubes placed in a water bath at 45° C. for one hour. They are then wiped clean and examined. The tubes containing the smaller quantities of acid are very slightly opalescent. Those containing the larger quantities of acid show a flocculent precipitate. With normal blood this usually occurs in the tubes containing 0·7 and 0·9 cc. N/1000 acid. The end point is the point half way between the first tube which shows a precipitate and the last which does not. A dropping pipette with an outside diameter of 1·2 mm. gives a drop of blood rather more than 0·02 cc. The exact volume for each experiment is obtained by weighing 5 or 10 drops, and from the known specific gravity. Since the size of the drop increases as coagulation becomes imminent, the drops should be distributed quickly.

There is a difference in the size of the drop which the same pipette will deliver from the blood of different individuals, even when all the samples show the same hæmoglobin content, but the variation in the case of blood showing the same percentage of hæmoglobin does not exceed 0·002 cc., so that for many purposes, using a well-standardized pipette, weighing may be dispensed with. Knowing the volume of the drops, the amount of acid required may be conveniently expressed either in terms of a standard drop of 0·02 cc. or as cc. of N/10 acid per 100 cc. of blood. The end point is ultimately the same at whatever temperature between 15° and 45° C. the reaction

takes place. The concentration of the acid and the volume are immaterial within wide limits. Comparison is facilitated by keeping them the same. The precipitate is due to the presence of some part of the formed elements of the blood which does not go into solution when blood is laked with distilled water. The reaction is the same after as many leucocytes as possible have been removed. The precipitate is soluble in alkali and in excess of acid. The presumption is that the precipitate is composed of the nucleo-protein of the red cells. The characteristic flocculation is probably due to the presence of stromata. The blood is more alkaline in the early morning, before sharp exercise. Ordinary food seemed to have no effect.

Experiments on the same lines were made with a view to ascertaining whether the change in the colour of the hæmoglobin from red to yellow, on the addition of acid, would serve as an index to the alkalinity. It was found that it was easier to determine a point where the colour ceases to become any more yellow on successive additions of acid. To obtain an expression of the alkalinity of the blood, the amount of an acid consumed in converting the hæmoglobin must be deducted. It was found that for every 10 per cent of hæmoglobin on the scale of the hæmoglobinometer, the hæmoglobin in 0·02 cc. of blood requires 0·295 cc. N/1000 acid.

Antitryptic Index.—Considerable interest is being taken in the antitryptic index, which depends upon the fact that if a drop of normal blood serum be added to a mixture of protein and trypsin, the process of digestion will be greatly retarded, and if the serum be taken from a patient suffering from certain diseases the process will be still more retarded. Perhaps the best way of obtaining the index is to note the diminution of viscosity which takes place in a solution of casein when it has been exposed to the action of trypsin. Eve[2] shows that this can be done by very simple means. Two mixtures of similar quantities of casein, trypsin, and serum (one normal, the other from the patient) are digested in an incubator for 4½ hours, and the number of seconds that each takes to drop through the viscosity pipette is compared. If the mixture containing normal serum passes through in 100 seconds, and the mixture containing pathological serum in 103½ seconds, the antitryptic index may be recorded as 3½. It is possible to measure the index with only $\frac{1}{12}$ cc. of serum, a quantity easily obtained from a finger prick. Eve suggests that repeated observations of the index may give guidance in the amount and frequency of doses of vaccines. A suitable dose lowers a raised index sharply without a preliminary rise. The curve of the antitryptic index is more even than that of the opsonic index, probably because it is more accurately measurable.

Weil[3] discusses the scope and nature of the antitryptic index, and gives references. It is now clear that the "antitryptic reaction" is not an exclusive characteristic of cancer. It marks the change from breast to artificial feeding in infants. It is found during labour and the puerperium as contrasted with pregnancy. The percentage

of positive results in cases of cancer ranges from 70 to 95 per cent. There is increased antitryptic activity of the serum in pneumonia, typhoid fever, sepsis, rheumatism, and tuberculosis. This also occurs in diabetes, exophthalmic goitre, and severe anæmia. Perhaps the chief diagnostic value of the reaction is that its absence may be looked upon as a strong argument against the existence of cancer. It is also of value in the diagnosis of the numerous obscure and abortive forms of exophthalmic goitre. It has been found that all human sera inhibit papain in a constant ratio to the degree to which they inhibit trypsin. The antitryptic function, therefore, although exercised by an albuminous, thermolabile body, differs from the true antibodies in the lack of specificity. Fluctuations in the antitryptic index are accurately foreshadowed by variations in the number of polymorphonuclear leucocytes.

Coagulation-time of the Blood.—Addis[4] finds that results cannot be relied on if the room temperature is above 68° F. Another factor which may influence the result, is the rate of the flow of blood from a puncture. This is due to the amount of thrombokinase, and its amount is determined by the time during which blood is in contact with the tissues in the wound. Constant results are obtained by engorging a finger by means of a bandage. It was found that in spite of extreme morphological, physical, and chemical alterations in the blood, the coagulation-time may nevertheless remain normal. There was always enormous delay of coagulation-time in hæmophilia. In other diseases of non-bacterial origin no constant change was found. In bacterial diseases there are no marked effects unless the organisms are actually present in the blood. The typhoid bacillus and the pneumococcus hasten coagulation. Streptococci and staphylococci delay it. Auto-agglutination of the red blood corpuscles was seen in varying degree in all acute bacterial infections except typhoid. It was most marked in cases of staphylococcal and streptococcal septicæmia. Moderate loss of blood has no effect on coagulability, but very large hæmorrhages are followed by an acceleration of coagulation.

Enumeration of Blood Corpuscles.—Price Jones[5] points out that Toison's fluid renders a number of the red corpuscles in anæmic blood invisible. The enumeration is therefore too low, and the colour-index becomes too high. Hayem's solution is not open to the same objection.

Carruthers[6] estimates leucocytes by mixing blood with 10 or 20 times its volume of distilled water. A drop of this diluted blood is transferred to a slide and allowed to dry. The blood pigment is gently washed away. The leucocytes may, if desired, be stained with methylene blue. The number of leucocytes per low-power field is ascertained. The field is circumscribed by a cardboard obturator with several perforations placed in the eye-piece.

Barnes[7] has made an experimental investigation of the error in differential leucocyte counting. He concludes that the results given by the Hastings modification of the Romanowsky stain are more accurate, with a less expenditure of energy, than the results given by

Ehrlich's triple stain, no matter what number of cells (between 250 and 1000) are examined. As a matter of routine clinical examination, an estimate based on the classification of 250 cells stained by the Hastings method gives sufficiently accurate results, whereas with the Ehrlich stain at least 500 cells must be counted.

A ready method of counting white cells is suggested by Bunnell.[8] Blood is diluted with acetic acid, which should be filtered. A drop of the diluted blood is placed on the ruled counting chamber; the cover-glass is applied and fixed in position with a rubber band. By holding the slide in front of a good light it is possible to count the leucocytes with the help of a pocket lens, the leucocytes showing no tendency to pass across the lines. It is not possible to count the red corpuscles in this way.

Enumeration of Eosinophiles.—Dunger[9] recommends the following solution: 1 per cent water-soluble eosin and acetone each 10 parts, distilled water 100 parts. Blood is diluted 1–10 in the white-cell pipette in the ordinary way with this fluid. After from three to five minutes, a portion of the diluted blood is placed on the counting-slide, preferably Türk's. The eosinophiles are stained distinctly, while most of the other cells are scarcely visible.

Reticulated Red Blood Cells and Basophilic Granules.—Ferrata,[10] in an extensive investigation, reaches the following conclusions as to the clinical and morphological significance of reticulated erythrocytes (vital staining) and basophilic granules: (1) *Reticulated red cells.* The substantia reticula-filamentosa is found normally in a few erythrocytes of the peripheral blood of adult animals; it is seen with much greater frequency (*a*) in the erythrocytes and normoblasts of the bone-marrow, (*b*) in the blood of new-born animals (30 to 40 per cent), and in still greater abundance in embryos. Reticulated red cells are also increased in the blood as a result of hæmorrhage, and in various toxic anæmias, especially primary pernicious anæmia. The reticulations are plasmatic in origin, since they are formed in normoblasts and also in the red cells of animals which possess only nucleated red cells. Their presence in the cell indicates its youth, and they are therefore to be interpreted as a sign of regeneration. (2) *Basophilic granules.* Since basophilic granules are missed in the blood of all animals in early embryonic life, and first make their appearance when the primitive erythroblasts with relatively small nuclei begin to change into primitive erythrocytes, it is concluded that, in embryos, these granules are visible evidence of the loss of the nucleus and, therefore, a sign of regeneration. Basophilic granules are also found in adult animals in mitotic normoblasts and in the bone marrow, and, being similar morphologically to those in embryos, one must believe that here, too, they are a sign of (pathologically increased) regeneration. Ferrata believes that these granules are nuclear in origin, and, with Pappenheim, assigns them to the parachromatin, while the "Jolly bodies" (nuclear particles) are chromatic in origin.

Konig[11] finds that basophile granules are found in the red corpuscles

of new-born infants in 4 to 5 per cent of cases, and in human embryos in 2 out of 6 cases. This is a further argument for the regenerative significance of these cells.

Glycogen Reaction.—It may be recalled that the glycogen reaction is obtained by mounting a dry blood film in a dilute solution of iodine in potassium iodide suitably thickened with gum. In a variety of pathological conditions the polymorphonuclear leucocytes show either a diffuse brown coloration or brown granules in their protoplasm. As a means of diagnosis, Cabot, Locke, and Gulland have attributed to the reaction a very high value. Brown[12] has not found the reaction of so much service. In his cases the leucocytosis was as reliable a guide to the underlying pathological condition as the intensity of the reaction. Where leucocytosis failed, there was a corresponding failure of the reaction, while in a few cases of pyogenic infection with little febrile reaction there was a decided leucocytosis and practically no iodophilia. In one case only was the reaction very striking while the leucocyte count was low—the former suggesting the true diagnosis. These results did not permit of a conclusion that the glycogen reaction is a more delicate test than the leucocytosis.

The intensity of the reaction varies with the kind of organism causing it, its virulence and mode of infection, and the reaction of the tissues. The reaction will sometimes prove a trustworthy guide as an auxiliary means of diagnosis, and will direct attention to the true nature of a case which may otherwise be overlooked. If the leucocyte count and the glycogen reaction are done together, the one will very much enhance the value of the other and form a surer basis of diagnosis. Though the method of examination is very simple, it demands the same precautions being taken as in all other tests, and to interpret the reaction correctly will also require a thorough examination of the patient and the exclusion, as far as possible, of complicating conditions.

Meiostagmine Reaction.—Ascoli[13] introduced this method, which promises to be of service in diagnosis. The principle is simple. If some of the diluted blood or serum of a patient suffering from an infectious disease or a malignant tumour be treated with a small quantity of the corresponding antigen and kept at 37° C. for two hours, its surface tension will be considerably reduced. The estimation of the surface tension is made by means of Traube's stalagmometer and (if desired) with the help of some form of automatic drop-counter. About 20 drops of blood may be allowed to fall into distilled water, so as to make a solution of about 1–20. To 9 cc. of this there is added 1 cc. of antigen emulsion in distilled water.

Ascoli and Izar[14] conclude that malignant tumours contain a specific lipoid substance, and that the sera of patients suffering from malignant tumour behave differently from normal sera towards these lipoids. The antigens in tumour extracts even of such widely different tumours as sarcoma and carcinoma, are very similar, and there is close similarity between the antigens derived from tumours of human subjects, mice, and rats. Izar has found that the meiostagmine reaction is positive

in cases of tuberculosis, echinococcus, ankylostomiasis, and typhoid. The typhoid antigen derived from the bacilli is soluble in absolute alcohol, but not in other common reagents. The reaction has been carried further. It has been found that if animals be immunized against Witte's peptone, gelatin, or horse-serum by injections of these substances, the surface tension of their serum is lowered by addition of the peptone, gelatin or horse serum. St. d'Este[15] gives tables showing the results of the reaction in a series of surgical cases in which it has helped in the diagnosis.

Leucocyte Granules.—An interesting discussion on this subject took place in the Berlin Hæmatological Society.[16]

Schridde's granules: These fine granules, which are brought out by staining with fuchsin, were thought by Schridde and Naegeli to exist only in lymphocytes, but there is now a considerable consensus of opinion that they also exist in the myeloblasts, and their alleged importance as a means of distinguishing between lymphocytes and myeloblasts therefore fails. It is recognized that *azure granules* exist in the lymphoid marrow cells as well as in true lymphocytes, so that they also fail to aid the differentiation of these cells. A sharp difference of opinion arose regarding the subsequent development of the azure granules in the promyelocyte or myeloblast. Grawitz and St. Klein held that the granules ripened to become the neutrophile granules of the myelocyte, while Pappenheim maintained that the azure granule is neither an unripe neutrophile granule, nor does it pass into a neutrophile granule, but that the neutrophile granules arise in the protoplasm quite independently, and in the process the azure granules are lost.

Blood Plates.—Controversy is still rife regarding the nature and origin of the blood plates. Aynaud,[17] in a long and important monograph, finds that the plates in the vessels of the omentum are elongated rods. The round form is due to changes in their environment. In the vessels the plates occupy the central stream along with the red corpuscles. The elongated form is retained after withdrawal by means of a waxed trocar until cooling takes place. There are no amœboid movements, but the plates react to protoplasmic poisons like leucocytes. No nucleus could be seen. Aynaud finds that the plates are not essential for coagulation of blood or retraction of the clot. The plates never find their way outside the vessels, and Aynaud has not seen them in the bone-marrow. He does not admit that they are derived from either red or white cells, and concludes that they are an independent element of the blood.

Bunting[18] studied the plates experimentally. In regeneration after hæmorrhage, etc., they follow the pathological law of regeneration in excess, but the regeneration curve does not follow that of either the red cells or leucocytes. He holds that the plates are entirely derived from detached pseudopodia of the megalokaryocytes (giant cells of bone-marrow).

Wright[19] reiterates the same view. He bases his conclusion on the

following observations: (1) That, with the aid of Deetjen's method there are seen protoplasmic movements of identical character in the marginal zone of the blood plates and marginal zone of the megakaryocytes. (2) A comparison of the number of blood plates in the blood and of the number of giant cells in the bone-marrow, in various morbid conditions, indicates a proportional relationship. Thus in pernicious anæmia and leukæmia there are few plates and few giant cells, while in post-hæmorrhagic and secondary anæmia both plates and giant cells are increased. (3) Plates do not appear in the blood before the megakaryocytes or their forerunners. (4) Blood plates are found only in mammals; and mammals are the only animals which have giant cells in the blood-forming organs. (5) Bunting's experiments (*ut supra*).

Ross,[20] using his alkaloid method of stimulating leucocytes, finds that the plates have the same diffusion co-efficient as the leucocytes, and holds that they are derived from the white cells.

Eosinophilia in Worm Infections.—Duncan Whyte[21] has had the opportunity of studying 562 cases of infection with *Ascaris lumbricoides, Trichocephalus trichiuris, Ankylostoma duodenale,* and *Clonorchis sinensis.* It was found that the number of leucocytes and the percentage of eosinophiles was greater in cases of multiple than single infection. The degree of eosinophilia was proportional to the number of individual parasites. Patients between twenty and forty years of age show a greater eosinophilia than others. Tuberculous patients do not show so great a degree of eosinophilia as non-tuberculous, with a worm infection of similar extent.

References.—[1]*Biochem. Jour.* v. 1910, p. 23; [2]*Brit. Med. Jour.* June 25, 1910; [3]*Amer. Jour. Med. Sci.* May, 1910; [4]*Edin. Med. Jour.* July, 1910; [5]*Brit. Med. Jour.* June 4, 1910; [6]*Ibid.* Dec. 18, 1909; [7]*Folia Hæmat.* ix., Part 1, 1910, p. 87; [8]*Jour. Amer. Med. Assoc.* Aug. 13, 1910; [9]*Münch. med. Woch.* Sept. 13, 1910; [10]*Folia Hæmat.* ix. 1910, p. 253; [11]*Ibid.* p. 278; [12]*Pract.* Jan. 1910; [13]*Münch. med. Woch.* 1910, No. 2; [14]*Ibid.* May 31, 1910; [15]*Berl. klin. Woch.* May 9, 1910; [16]*Folia Hæmat.* ix. 1910, p. 406; [17]*Thèse de Paris,* 1910; [18]*Jour. Exper. Med.* xi. p. 541; [19]*Jour. Morphol.* xxi. 1910; [20]*Lancet,* Sept. 4, 1909; [21]*Ibid.* July 30, 1910.

HÆMATOMATA. (*See* Arteries Surgery of.)

HÆMOPHILIA. *George Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Pathology.—Nolf and Herry[1] do not agree with the Morawitz theory of coagulation of the blood. They consider that the interaction of fibrinogen, prothrombin, and thrombozyme gives origin to fibrin and thrombin. Thrombozyme is not found in glands or muscle. It is abundant in leucocytes, blood plates, and vascular endothelium. The blood thus contains all the elements necessary for the formation of clot. It remains fluid in the vessels, because the liver produces antithrombin, and in normal conditions there is an equilibrium maintaining fluidity. In certain intoxications the liver may secrete this antithrombin in great excess, but this is not a factor in producing hæmophilia.

Coagulation is aided by thromboplastic substances, such as foreign material, granules of fibrin, etc. The cause of hæmophilia is the functional insufficiency of thrombozyme. The vascular endothelium plays an active part in secreting this thrombozyme, and along with deficiency in this function there is an associated friability which explains the many slight accidental hæmorrhages in hæmophilia which are not accounted for by mere incoagulability of the blood. The thrombokinase theory is the result of the confusion of two distinct factors, thrombozyme and thromboplastic agencies. There is no evidence, either experimental or clinical, which tends to show that the thromboplastic agents of the tissues are abnormal in hæmophilia.

Addis[2] reported to the annual meeting of the British Medical Association the results of a research in twelve cases from six unconnected families. In all, the coagulation time was delayed, in the severer cases as much as one hour. The investigation was directed to ascertaining whether there was delayed thrombin formation, or whether the fault lay in the reaction between thrombin and fibrinogen. Hæmophilic thrombin was found to be as active as normal thrombin. There was no quantitative deficiency in the hæmophilic fibrinogen, and it was as readily coagulated by thrombin as normal fibrinogen. On the other hand, the rate of formation of hæmophilic thrombin was much slower than the normal. The cause therefore was something which hindered the formation of thrombin in hæmophilic blood. There was no evidence of any inhibitory substance.

It was not possible to obtain a coagulation time as short as that of normal plasma by the addition of any amount of calcium. When large amounts of thrombokinase were added, the coagulation of both hæmophilic and normal plasma was very rapid. When smaller amounts were added, the characteristic delay in the coagulation of hæmophilic plasma again became evident. When the amount of thrombokinase in normal and hæmophilic blood was compared, no difference could be detected. A deficiency in thrombokinase was therefore not the cause.

There was no quantitative deficiency of prothrombin, but a qualitative difference was found, inasmuch as it showed a very slow rate of change into thrombin in the presence of calcium and thrombokinase. It was found that the addition of very small quantities of normal prothrombin greatly accelerated the coagulation of hæmophilic plasma, whereas the addition of equal quantities of hæmophilic prothrombin had no effect. The disease is therefore ascribed to an inherited abnormality in the construction of the prothrombin of the blood which reveals itself in the unduly long time required for its activation.

Treatment.—Nolf and Helly (loc. cit.) consider that **Lime Salts** can do some good, as hæmophilic blood, like normal blood, does not contain the quantity which corresponds to the optimum action of these salts. The results are inconstant and never marked. Better results are obtained by the injection of **Serum** of different mammals.

Heated serum, or serum such as antidiphtheritic, which has been kept, is just as efficacious as fresh, although no thrombin is contained. The injection of serum is not immediately beneficial, and a hæmatoma is produced at the site of injection, where it is in greatest concentration. It is active at a distance when it has been mixed with the whole mass of the blood.

Propeptone is a more powerful agent in the same direction. When injected slowly, it leads to a reaction on the part of the leucocytes and vascular endothelium by which thrombozyme is added to the blood, but if injected rapidly the liver throws out antithrombin and annihilates the leucocyte reaction. Many albuminous substances foreign to the blood have a similar action, but Witte's peptone is the most active. It is probably preferable to serum when a more abundant supply of thrombozyme is desired. A subcutaneous injection of 10 cc. of a 5 per cent solution in 5 per cent sodium chloride may be given on alternate days. It gives good results in rebellious hæmorrhage in conditions other than hæmophilia. Its only danger is that it may momentarily increase the hæmorrhage it is desired to check. From all other points of view it is preferable to serum. It is more energetic, and it is easily obtained and easily sterilized. It is well borne, and can be used repeatedly without fear of anaphylaxis. It acts favourably not only on the hæmophilic but on the purpuric (vascular) element.

Arnsperger[3] gives a detailed account of treatment, based on the view that hæmophilia is due to a want of thrombokinase. Females of hæmophilic families should not marry. Males without symptoms may marry. Articles of diet such as tea, alcohol, etc., which may raise blood-pressure, should be avoided. Children should be guarded against dangerous games, and their occuptaion in life must be carefully selected. Salines should be taken daily.

When there are symptoms, large doses of **Calcium Lactate** are advised and **Gelatin** should be taken daily. Subcutaneous injections of fresh **Serum** (15 to 30 cm.) may be given daily, but serum-therapy is not yet so established that other measures may be dropped. Internal styptics are useless. For local bleeding, a tampon soaked in 10 per cent gelatin, serum, calcium chloride, iron, and adrenalin may be used. For hæmaturia, etc., **Gelatin** may be given by the mouth. Urgent operations should be preceded by a course of calcium chloride or serum.

REFERENCES.—[1]*Rev. de Méd.* Dec. 10, 1909, Jan. Feb. 1910; [2]*Quart. Jour. Med.* Oct., 1910; [3]*Deut. med. Woch.* June 16, 1910.

HÆMOPTYSIS. *Joseph J. Perkins, M.B., F.R.C.P.*

The value of **Injections of Normal Serum** in checking persistent hæmoptysis is well shown in a case recorded by J. W. Dewar.[1] The patient, a man of forty-three, had been under treatment for some time, and had done so well that this had been omitted for eight months, and he had returned to work. Severe hæmorrhage occurred, and continued

unchecked in spite of energetic treatment. The following remedies had been tried: Complete rest in bed in a cool room, semi-recumbent, not allowed to speak; ice-bag over cavity; cold packs to abdomen and hot bottle to feet; 3 gr. of calomel followed by 1 oz. of castor oil; morphine and atropine hypodermically; inhalations of nitrite of amyl; hypodermics of ergotinine; calcium chloride in large doses orally; calcium chloride in large doses (enemas); suprarenal gland; 10 cc. of normal serum by the mouth thrice a day.

All modes of treatment having proved unavailing, and the hæmorrhage continuing in increased amount for sixteen days, till the patient was blanched and in a state of great prostration, 20 cc. of normal serum were injected into the radial vein: an immediate improvement followed, and the injections were continued for six days. All hæmorrhage ceased, but the patient suffered from an exceedingly severe attack of "serum disease" (rash, pains in the joints, swelling of the sternomastoids and itching), which nothing relieved, but which gradually subsided.

The chief points of interest in the case are the power of serum injected intravenously where administration by the mouth and enema failed, and the failure of calcium salts which the patient had been taking already to counteract a tendency to constipation to check the unpleasant after-symptoms

Periodical or Recurrent Hæmoptysis.—Hæmoptysis is so significant of tuberculosis that it is interesting to meet with records of cases free from this suspicion. In one of Hay's cases,[2] a woman, recurrent hæmoptysis of nine years' duration was of angioneurotic origin, coinciding with the appearance of superficial œdematous swellings, and alternating with hæmaturia. In his second case, a man, hæmorrhages had recurred over a period of six years, though there was no evidence of tuberculosis, the general health being excellent. Examination of the lungs by ordinary methods and by *x*-rays revealed absolutely nothing abnormal between the attacks; at the time of the hæmorrhage the blood could be seen to occupy a cavity in the right lower lobe which had previously defied detection, and which presumably resulted from an attack of pneumonia some years previously.

Eastman's[3] cases bring out another cause of recurrent hæmoptysis, the menstrual period in women. Some of the patients in this series were tuberculous, but others were completely free from any suspicion of that disease. The hæmoptysis is probably the result of pulmonary hyperæmia, and may occur at intervals of a month over a long series of years. It may be profuse and even fatal.

REFERENCE.—[1]*Brit. Med. Jour.* Dec. 11, 1909; [2]*Med. Press*, Sep. 29, 1909; [3]*Bost. Med. and Surg. Jour.* Mar. 10, 1910.

HÆMORRHAGE.

Atropine successfully used in cases of placenta prævia, post-partum hæmorrhage, menorrhagia, hæmophilia, and hæmatemesis (*page* 20); **Pituitary Ext.** in post-partum (*page* 46).

HÆMORRHOIDS.

Thymus Gland in (*page* 55).

HÆMOSTASIS. *Priestley Leech, M.D., F.R.C.S.*

About two years ago Momburg,[1] of Spandau, recommended hæmostasis for operations on the lower part of the body by means of an indiarubber tube drawn tightly round the body. He used a tube as thick as a good-sized finger, and wound it two to four times round the body between the ribs and the pelvis, stretching the tube as in applying the usual tourniquet, until the femoral pulse was no longer perceptible. In order to avoid as far as possible any interference with the circulation in the superior mesenteric artery, Momburg raised the pelvis, and even shook the body, to cause the intestines to glide towards the diaphragm, so that they should not be constricted by the tube, which is applied before the pelvis is lowered into the horizontal position. The nerve endings of the vagus and sympathetic escape being compressed by the pressure of the tube. This put too much work on the heart through some of the blood of the lower limbs being driven above the constricting band; in order to avoid this, Esmarch's bands were placed on the legs.

Zur Verth[2] says the advantages of this method are in saving loss of blood in operations on the pelvis and lower part of the body; it is also easier to differentiate between healthy and diseased tissues. In addition, the patients need less ether or chloroform for complete anæsthesia. The intestines and ureters would appear not to be liable to damage; but in one case, a boy of eleven, who died from heart failure, post-mortem examination showed a portion of the middle part of the small intestine to be reddened; the corresponding mesentery was also red, but microscopical examination revealed no thrombosis of the vessels. Great care should be exercised in cases of heart and lung disease, and also in arterial sclerosis; as the mean of ten observations made by zur Verth, the blood-pressure was raised 24 mm., and after removal of the tube, fell below normal. He thinks it advisable that the raising of the pelvis should not be done before putting on the tube, because the intestines may act as a pad and prevent undue pressure on the mesentery by the tube; he also recommends that Esmarch's bandages be placed on both thighs previous to constriction of the body.

Hans Ehrlich[3] reports a case of division of the femoral artery where Momburg's method was used, and in which, fifteen minutes after the operation was finished, there was a marked fall of temperature to 35·2° C.; it rose in the next five hours to 37·2° C. (98·6° F.), and thereafter was normal. The writer then made some experiments on animals, and concluded that the exclusion of the lower part of the body from the general circulation leads to a marked fall in the body temperature after thirty minutes, and after seventy minutes a notable loss of warmth occurs, which in guinea-pigs may even lead to death; in anæmic animals the bad effects extend over a longer period.

Gross and Binet[4] report a case of sudden death after the employment of this method. The patient, a woman, twenty-seven years old, had an old tuberculous arthritis of the knee, with an upward spreading abscess; amputation of the hip was done, and everything was progressing favourably when, after the operation was completed and the vessels ligatured, and as the tube was slowly released, the pulse suddenly stopped, the patient became pale, and died in spite of efforts at resuscitation. Post-mortem: acute distention of the right ventricle; vegetations on the mitral valve and chordæ tendineæ, and a few on the edges of contact of the aortic valves. The heart muscle was pale, and the subpericardial fat penetrated the muscle as far as the endocardium. The heart had been carefuly examined beforehand, and no murmur or other signs of heart disease could be detected. They doubt whether there have not been more deaths due to it than have been reported, and where death has taken place it has been ascribed to some other cause than the application of Momburg's tube; they think the method should be reserved for special cases.

Gerster,[5] of New York, reports a case in which this method was used to secure hæmostasis in a case of disarticulation of the thigh. He says that the method should not be used in presence of marked arteriosclerosis, myocarditis, or valvular lesions, except under the most stringent necessity and as a last and desperate resort. He gives a résumé of the various methods adopted in its application. It is very useful in midwifery practice for hæmorrhage, placenta-prævia and post-partum.

References.—[1]*Cent. f. Chir.* No. 23, June 6, p. 647 to 699; [2]*Münch. med. Woch.* Jan. 25, 1910; [3]*Wien. klin. Woch.* Ap. 7, 1910; [4]*Rev. de Chir.* May 10, 1910; [5]*Ann. Surg.* June, 1910.

HALLUX VALGUS. *Priestley Leech, M.D., F.R.C.S.*

Jackson Clarke[1] says that the treatment of this condition is not given in a satisfactory manner in the present surgical text-books. To ensure a cure, the joint and the bursa covering it must be excised. The method he recommends is as follows: An incision is made between the superior and lateral aspects of the joint; if there is a bursa and the skin is much distended, excise the skin and adjacent bursa by an elliptical incision. With a curved, sharp, periosteal elevator, clear the attachments of the ligaments all round the articular surface of the head of the bone. Gigli's saw is then passed under the head of the metatarsal bone, and the head is removed, except a portion of the under surface, where the sesamoid bones articulate, and which is left covered with its cartilage. All the angles are rounded off with a pair of bone-forceps, especially the inferior angle, where a portion of cartilage was left; the lateral edges are cut away, leaving a round surface; this is a very important part of the operation in preventing stiffness afterwards. One or two stitches are inserted to fix the internal lateral ligament to the periosteum, another important

step in view of preventing a speedy recurrence of the deformity. A splint (Clarke uses a bunion lever) is kept on for a few days, and one should begin to move the joint not later than nine days after the operation. If the splints are left on too long, the joint may become stiff.

REFERENCE.—[1]*Med. Press*, Ap. 20, 1910.

HAMMER-TOE (Operation for). *Priestley Leech, M.D., F.R.C.S.*

Wheeler,[1] of Dublin, describes a very neat operation for this condition in which local anæsthesia is used. Rubber tubing is employed to encircle the hammer toe, as seen in *Fig.* 17. The tube should not render the toe bloodless; its use is to localize the anæsthetic solution, and it should be removed immediately prior to the operation. The hypodermic needle is inserted on each side on the lateral aspect, immediately in front of the coil of tubing encircling the toe, and is pushed distally down to the bone. A transverse elliptical incision is made across the toe, so designed that it removes the corn-bearing skin (*Fig.* 17). The skin and corn are removed, and the joint with the three lips of the extensor tendon is well exposed. The head of the first phalanx is exposed with a little

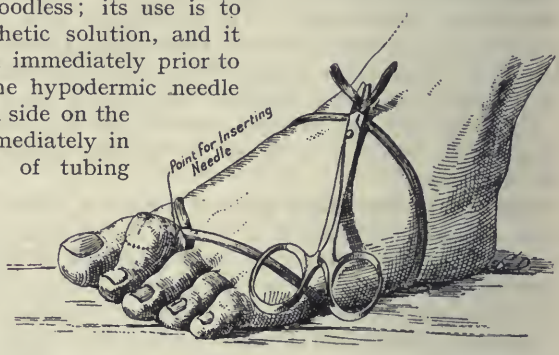

Fig. 17.—Hammer-toe. Wheeler's operation under local anæsthesia. (*a*) Point for insertion of needle.

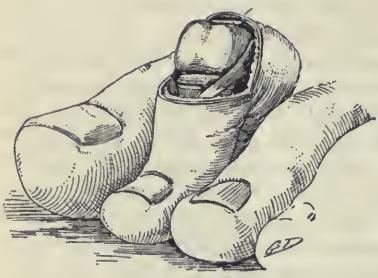

Fig. 18.—The central strip of the extensor tendon is divided and the head of the first phalanx protruded through the lateral portions.

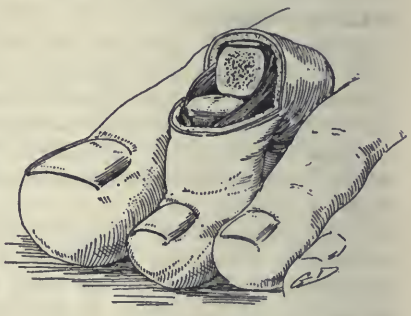

Fig. 19.—The head of the phalanx has been removed with bone forceps.

dissection and the use of a periosteal elevator; the central slip of tendon is divided, and the head protrudes through the two lateral slips (*Fig.* 18). The head is removed by means of a fine saw or bone

forceps, and the toe brought into position (*Fig.* 19). The skin is next sewn, and a collodion dressing applied, and over it a strip of adhesive strapping in the reverse manner to that shown in the illustration. It is laid over the wound and proximal phalanx with the adhesive side uppermost ; the ends are then passed under the adjoining toes, to which they become fixed. This counteracts any tendency to hyperextension of the affected digit. The patient from the first is allowed to walk about in an easy shoe, and after a fortnight all dressings are discarded.

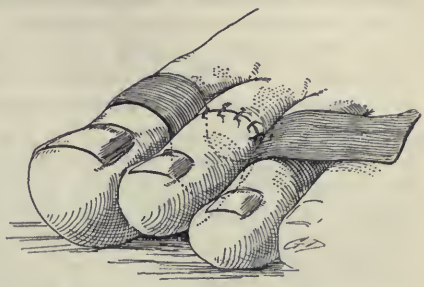

Fig. 20.—Final stage. The approximation of the skin edges with sutures brings the toe into position. The strapping is usually applied over the toe in the reverse manner to that illustrated.

REFERENCE. — [1]*Med. Press*, Jan. 12, 1910.

HEAD, INJURIES AND DISEASES OF.

X-ray diagnosis (*page* 74).

HEART, CONGENITAL MALFORMATIONS OF.

Carey F. Coombs, M.D., M.R.C.P.

The Wightman Lecture for 1909, delivered by the late Dr. George Carpenter,[1] contains a vast amount of clinical information drawn from the author's extensive experience ; but like all those who have summarized clinical observations of the same subject, his opinion is that it is very difficult to find out what is the actual lesion in any given case. As he says, there is some value in doing so when possible, as without it a true prognosis cannot be made.

CAUSATION.—He quotes various examples to show that congenital cardiac malformation may be a hereditary disorder. He does not believe in " maternal impressions," and considers syphilis unimportant. In none of his cases was there a history of acute rheumatism in the mother during pregnancy. Alcoholism in parents has been shown to predispose to malformations in general, therefore to cardiac ones in all probability. Developmental error is a much more important factor than fœtal endocarditis ; but there are a few undoubted examples of the latter on record.

SYMPTOMS.—(1) *General. Cyanosis* is not invariable ; it may come on after an infancy free from it, being provoked in such cases by the pulmonary complications of measles, etc. In some cases there is paroxysmal increase of the cyanosis. The retinæ may be visibly cyanosed. There is general capillary and venous distention, with hypertrophy of the walls of the veins. He ascribes cyanosis to deficient oxygenation. In *clubbing of fingers and toes* it may be only the soft parts that are increased ; or, in addition, the phalangeal periosteum may be thickened. Osteo-arthropathy has been seen. *Polycythæmia* is a

compensatory process, the body endeavouring to make up its oxygen deficiencies by an increase of oxygen-carrying corpuscles. *Murmurs* are present in nearly all cases ; their variability is remarkable, and in some cases they may disappear permanently, possibly as the result of a late closure of the ductus arteriosus.

(2) *Differential.*—In cases of *patent interventricular septum*, cyanosis is unusual. Paradoxical embolism may occur. There is usually a loud systolic murmur, loudest to the left of the sternum somewhere between the second space and the seventh chondrosternal joint. *Defects of the auricular septum* cause a murmur but rarely ; sometimes one occurs which is presystolic to systolic in time. It is a common defect, unimportant except in association with others. *Pulmonary stenosis* and *atresia* are common defects, stenosis being three times as common as atresia ; the former is especially associated with defects in the septum ventriculorum, atresia with patency of the ductus arteriosus. In the former association the aorta is often transposed and may, by opening just above the septal defect, drain both ventricles. Deep percussion and radiography will usually prove hypertrophy of the right ventricle in cases of pulmonary stenosis. Cyanosis is the rule. There is generally a systolic bruit spreading from the pulmonic area over the left upper front towards the left clavicle ; it may be heard in the back, and (if associated with ventriculo-septal defect) in the vessels of the neck. Occasionally a pulmonary diastolic murmur is noted. Skiagrams may show absence or deficiency of the pulmonary artery. Experience teaches that children with pulmonary atresia and closure of the interventricular septum, die in infancy ; with atresia and a patent septum, in childhood ; with pulmonary stenosis and a patent septum, adult life is sometimes reached but not passed ; with stenosis and a closed septum, they may attain to middle life. *Patency of the ductus arteriosus* is rare by itself, common with other defects. The signs are hypertrophy of the right ventricle, dilatation of the pulmonary artery (seen as a dome-shaped cap to the cardiac *x*-ray shadow), a continuous roaring systolic-diastolic bruit often reaching its maximum in the area along the left sternal border, and a vertical strip of dullness in the same position. This murmur may travel into the great vessels of the neck, and is sometimes accompanied by a thrill. In infants these signs are indistinct, and the murmur is systolic rather than continuous. *Coarctation of the aorta*, or narrowing of that portion which lies between the origin of the left subclavian artery and the ductus arteriosus, likewise produces more definite signs in the adult than during infancy. In both there is a loud systolic murmur all over the chest, sometimes with a double murmur at the apex ; in adults, collateral circulations between the upper and lower parts of the trunk have developed superficially, and forcible pulsation in the carotids contrasts with feeble pulsation in the lower limbs. *Congenital* (valvular) *aortic stenosis* is very rare, and the acquired form is not unknown in quite young children ; congenital lesions of the *auriculo-ventricular* valves are also rare ; and *aortic hypoplasia*, though it does occur, is of doubtful import.

Congenital cardiac hypertrophy is another rare condition, producing pallor and restlessness, and terminating by tricuspid failure. *Dextrocardia* without other visceral inversions is almost unknown.

REFERENCE.—[1]*Proc. Roy. Soc. Med.* 1909 (Sect. Study of Dis. in Children), p. 275.

HEART DISEASE. *Carey F. Coombs, M.D., M.R.C.P.*

ANATOMY.

Keith and Ivy Mackenzie[1] give an account of those remains of the embryonic cardiac tube which persist in the human heart. These are (1) The sino-auricular node situated at the junction of the great veins with the right auricle ; (2) The auriculo-ventricular node, in the right auricular wall near the opening of the coronary sinus ; (3) The auriculo-ventricular bundle of His, a strip of muscle arising from (2) and spreading into branches which ramify throughout both ventricular walls. Both the nodes represent all that remains of what were originally rings ; similarly (3) is the vestige of a tube. The nodes are points of neuro-muscular fusion so intimate that it is impossible to say where the nerve-fibre leaves off and the muscle-fibre begins. Thorel[2] claims to have found a definite bundle of muscle running through the right auricular wall and connecting the two nodes ; but Monckeberg[3] does not agree with this, and brings evidence to the contrary from serial sections. Cohn[4] has at any rate been able to prove that the auricular musculature has a regular connection with the auriculo-ventricular node.

ETIOLOGY.

Ruhemann[5] attributes great importance to *influenza* as a cause of cardiac breakdown in elderly people, its toxins acting in an already enfeebled myocardium as the "last straw." In his desire to uphold this proposition, he claims to prove the influenzal nature of various phenomena (bronchitis, etc.) by bacteriological and agglutinative tests, as well as by a history of influenza in other members of the same household.

Teissier[6] finds facial *erysipelas* often accompanied by evidences of mild and temporary ventricular dilatation due to acute myocarditis (or to acute myocardial intoxication rather than infection). It is not of serious prognostic import.

Megaw[7] and Rogers[8] draw attention to the great importance of *syphilis*, and the small importance of rheumatism in the causation of heart disease in India. Benda and Pick[9] describe certain rare cases of stenosis of the superior vena cava with signs of venous stasis in the area drained, due to syphilis. A full account of the part played by syphilis in the production of cardiac disease is given by Sears ;[10] it is too detailed for abstraction here.

Hay[11] reviews the influence of *pulmonary tuberculosis* on the heart, and concludes that (1) The tuberculous toxins cause tachycardia—continuous or temporary but easily excited,—vasomotor irritability,

and a lowering of blood-pressure ; (2) Chronic widespread tuberculosis may mechanically embarrass the right heart, limiting the field of cardiac response, and bringing some element of risk into the over-feeding system ; (3) Phthisis is infrequent and slow in persons with valvular disease ; (4) Tuberculous and other forms of cardiac infection are rare in phthisis, ulcerative endocarditis being the commonest of these.

As to the etiology of *ulcerative endocarditis*, more has been added to the very interesting bacteriological data recorded in last year's *Annual*. Bernstein's[12] work confirms the latter in proving (1) The importance of blood-culture in the diagnosis of ulcerative endocarditis, and especially of its actual bacteriological cause ; (2) The predominance of streptococci as causal agents, and the frequency of endocarditis due to *B. influenzæ* ; (3) The large proportion of cases (80 per cent) in whom rheumatic infection has preceded the destructive endocarditis. He also recovered micro-organisms by lumbar puncture in two cases. He collects blood for culture from the vein direct, by a needle connected with a glass bulb which is filled by suction through a tube with mouth-piece such as is used with a hæmocytometer, and separated from the main bulb by a small bulb in which lies a plug of sterilized cotton-wool. Again, Libman and Celler[13] publish some very important observations on 43 cases of what they call "subacute infective endocarditis" (see below, in clinical section of this article). From these they made successful blood cultures in 36 instances ; 35 times they found a streptodiplococcus, and once *B. influenzæ*. In all cases the active disorder appeared to be superimposed on old rheumatic heart disease. The observations of Schottmüller[14] point in the same direction ; in five cases of what he very aptly calls, "endocarditis lenta" he isolated by blood culture a streptococcus, "mitior seu viridans." By all these workers we are being led to a belief in the pre-eminent part played by a member or members of the streptococcal group in the production of a destructive inflammation of the cardiac valves. These may be compared with the findings of Clements,[15] who isolated from the warty vegetations of a fatal case of scarlatinal endocarditis, and from the living joint of a case of scarlatinal arthritis, a short streptococcus. Before leaving the subject of causation of endocarditis, we may note Norton's[16] two cases of fulminating malignant endocarditis in pregnant young women ; and the experimental production of chronic mural but not valvular endocarditis by injection of spartein sulphate followed by adrenalin chloride (Christian and Walker[17]).

Pathology.

Fetterolf and Landis[18] show, from consideration of anatomical relations, that the *hydrothorax* of cardiac disease is due to compression of the pulmonary veins and leakage from the visceral pleura. A left-sided effusion is due to compression of the left pulmonary veins by an enlarged left auricle ; conversely, right auricular enlargement compressing the right pulmonary veins causes a right-sided effusion.

Rollet,[19] discussing enlargement of the *coronary sinus*, points out that it may vary considerably in size, even in health ; and that it may share in dilatation and hypertrophy of the right auricle to such an extent as to become a tumour compressing neighbouring structures. A factor in its enlargement is persistence of the left superior vena cava, of which the coronary sinus is the relic. Smithies[20] records three cases of *intracardiac thrombosis*, possibly associated with syphilis. The etiological factors in such cases are circulatory stagnation, endocardial injury liberating thrombokinase, and bacterial toxins increasing the hæmagglutinins of the blood. The left auricle is much the commonest site. There are no very definite clinical features ; a presystolic murmur has been described, and in one of Smithies' cases there were signs of embolism and evidences of distress out of proportion to the cardiac physical signs. The case recorded by Phillips[21] is of the same order, one of mitral stenosis with secondary changes in the overstrained walls of the pulmonary veins, thrombosis within these vessels, disproportionate dyspnœa, and finally embolism of the abdominal aorta.

Habgood's[22] paper is an interesting commentary on the relative rarity of mitral stenosis in children. In 1182 autopsy records at the Victoria Hospital for Children there were only 30 cases of mitral stenosis. One of these was a doubtful congenital case ; most of the rest were clearly rheumatic, with evidences of pericarditis and disease of other valves ; 8 were males, 22 females ; over half died between six and ten. Œdema of the lungs, hæmorrhagic infarction, and ascites were frequent. He notes an antagonism between dense pericardial adhesion and mitral obstruction ; the former holds the heart open and thus prevents narrowing of the mitral channel.

Symptomatology.

Ulcerative Endocarditis.—Falconer[23] examined the eye-grounds in fifteen cases of chronic septic endocarditis, and in five found retinal hæmorrhage or optic neuritis, or both. He holds that in every case of chronic endocarditis such an examination should be made, as the discovery of retinal changes spells a grave prognosis.

Libman and Celler[13] find that cases in the majority of which streptococci could be cultivated from the blood, constitute a definite clinical group to which they apply the term "subacute infective endocarditis." The features are a history of previous rheumatic heart disease, an insidious onset, a duration of four to eighteen months, fever, sweats, malaise, wasting, weakness, gastro-intestinal disturbances, enlargement of the spleen, pains in the limbs, painful erythematous nodules in the skin, and tenderness over the lower sternum. Under the title of "endocarditis lenta," a group of five cases of similar nature is described by Schottmüller.[14] This type of case is similar to that labelled "chronic infective endocarditis" by Osler and by Horder (see last year's *Annual*). The prognosis of such cases, in spite of their gradual progress, is unfortunately no better, as far as the final result is concerned, than in cases of ulcerative endocarditis which run a more rapid course.

Cardiac neuroses are discussed by Herz,[24] who says that the association of subjective cardiac symptoms with a low blood-pressure is evidence of a functional disturbance of the heart if primary disease of the myocardium be excluded. The same may be said of the association of low blood-pressure with an extrasystolic arrhythmia. He speaks of three types of neurosis: nervous hypotonia with painful sensations in the precordium, nervous bradycardia with palpitation, and bradycardia with hypotonia and general bodily weakness.

The influence of *muscular stress* upon the heart is a matter of much debate. On the one hand there are those who think acute overstress of the heart is a common occurrence (Schott[25]); on the other, we have the high authority of Sir T. Clifford Allbutt, who concludes a masterly article reviewing the whole subject[26] by saying that he considers "the importance of muscular effort as a factor in cardiac injury has been much exaggerated." Certain definite data are worthy of note. First, there are those of Michell, included in Allbutt's article, derived from observation of a large number of University athletes. He notes certain "healthy" cardio-vascular results of three years' athletics; namely, progressive reduction of the pulse-rate and of the difference between morning and evening pulse-rates, and a gradual increase in the size of the left ventricle. Over-stress produces other effects noted in certain stages; (1) Increase of the pulse-rate, especially in the evening rate; (2) A rise of arterial tension; (3) Shortening of the diastolic pause; (4) Evidence of mild but definite ventricular dilatation. At this stage most men are stopped; some who go further experience cardiac distress and pain, and show a more extreme degree of dilatation. (See also under "Treatment.") Such dilatation, though enduring for a time, is not permanent unless it is in part due to infective disorders of the myocardium (diphtheria, etc.). Rivière[27] describes dilatation of the left ventricle as he noted it in a party of school-boys whose holiday programme had not allowed enough time for rest. Deane[28] has examined the effect of severe exercise on the pulse-rate; and finds an immediate acceleration with a quick return to normal, even in persons who have indulged in an unpractised exercise. He does not find any reason to believe pulse-rate observations after exercise likely to constitute a good test of cardiac efficiency.

The diagnosis of *acquired lesions of the right heart* comes up in two papers. In the first, Felderbaum[29] records a case which confirms Mackenzie's observation, that a well-marked auricular wave in the liver tracing is almost diagnostic of tricuspid stenosis. Hall,[30] of Denver, in an interesting analysis of 600 cases of heart disease, says that he finds pulmonary regurgitation due to over-stress in the pulmonary artery, of the type described by Steell, fairly common in cases of mitral stenosis. The diagnosis of this disorder he bases upon enlargement of the right heart, with dyspnœa, a pulse not aortic in type, and a diastolic murmur down the left sternal margin. [Rather scanty evidence; aortic and mitral valvular disease often coincide in rheumatic hearts, and the former lesion may produce a left-sided

murmur, while the characteristic features of the aortic pulse are masked by the effects of the accompanying mitral lesion.]

The "*signe de Musset*" alluded to by Brelet[31] was described by Alfred de Musset, who observed it in his own case; it consists of an antero-posterior oscillation of the head synchronous with the pulse, which occurs in sufferers from aortic regurgitation.

Gordon[32] brings forward many arguments to show that, with the patient standing upright, it is much easier to percuss out the rightward edge of cardiac dullness accurately than with the patient lying down, and pleads for more care in the determination of so important a matter.

Auscultation.—Thayer's[33] systematic investigation of normal persons showed that a third heart-sound was audible in two-thirds of those under forty, especially in persons with slower pulses. It probably corresponds with the fourth wave of the jugular tracing described by A. G. Gibson, of Oxford, both being due to the sudden upfloat and tension of the auriculo-ventricular cusps, caused by the blood driven into the ventricle in early diastole by the contracting auricles. The time relation of this third to the other sounds is different from that of the "third" sound whose appearance constitutes "bruit de galop," as it is ordinarily understood; in the former case the third sound occurs shortly after the second, of which it is the pale reflection, while in the latter, according to Potain's definition, the added sound is closely precedent to the first. Roch[34] finds it in a heart overcome in an attempt to lift an excessive mass of blood or to cope with abnormally high resistance, beaten either by reason of its antagonists' strength or because of its own weakness. When the heart is finally defeated, the "galop" rhythm disappears. What has particularly interested Roch is the case occasionally seen in which this rhythm is only heard at the apex of the epigastrium. Are we to regard this as evidence of right rather than left ventricle defeat? In many cases, no; it simply means that emphysema blots out the sounds which would otherwise be heard at the cardiac apex. In some cases, yes; but as these are often cases of emphysema, they will not be easy to distinguish clinically, except perhaps by the absence of arteriosclerosis, renal disease, high tension, or left ventricle hypertrophy. Broadbent[35] shows that a mitral systolic murmur is more often due to dilatation of the mitral ring (in infective or chronic fibrous myocarditis) than to disease of the valve curtains. The degree of regurgitation, he says, is to be estimated by the extent to which the first sound is "replaced" by the murmur, the amount of right-heart enlargement, the accent of the pulmonic second sound, and the degree of exertion necessary to provoke dyspnœa. Henschen[36] thinks that "functional" systolic murmurs are due to the same mechanism, stretching of the muscular fibres around the mitral orifice, and consequent slight incompetence.

Brockbank's[37] important article repeats the theory advanced by him elsewhere,[38] to the effect that the characteristic crescendo murmur of mitral stenosis is not accurately described by the adjective "presystolic"; that, in fact, it is caused by the forced back-flow of

blood into the left auricle during ventricular systole, and not by auricular systole driving blood through a narrowed mitral opening at the very end of ventricular diastole, as is usually supposed. The evidence in favour of this change of theory is not adequate in the opinion of most physicians, and has been subjected to free criticism, the gist of which is that when the systole of the auricle fails in cases of mitral stenosis, the crescendo murmur fails too ; and that when by reason of heart-block in mitral stenosis (under the influence of digitalis, etc.) a ventricular systole is suppressed, though the preceding auricular systole persists, the crescendo murmur persists also (Cohn,[39] [40], Turnbull[41]).

The relation of *orthodiagraphy* to examination of the heart is discussed in a thoughtful paper by Claytor and Merrill,[115] who state that it is quicker and more accurate than skiagraphy ; that while percussion can map out the left border of the heart, orthodiagraphy can more certainly determine the position of the right border ; and that though it is not to be regarded as a substitute for the older methods of examination, it is nevertheless a valuable addition.

Graphic Methods : Polygraphy and Electrocardiography.—The study of cardiac disease by means of the polygraph continues to interest many observers. There is, however, a manifest feeling that the conclusions regarding heart disease which have been drawn from a study of polygraph tracings have, in some instances at least, been formulated with too little regard for other data ; and that some of these conclusions need further confirmation before they can be accepted, while others are already proved inaccurate. Little has been written regarding the technique of polygraphy, though Janowski's[42] article gives a good account of the means used to obtain direct curves of the left auricular movements by an œsophageal air-bulb and tube connected with a writing apparatus.

In electrocardiography we find very distinct advance. Work has been done which is of special value just at present, in that it affords one form of check on the conclusions drawn from polygraphy, leading to confirmation of some, to rejection of others, and to further suspension of judgment in others. Clearly it is a means of investigation which has come to stay, not so much by way of throwing light on individual cases, as to clear up certain problems by accumulation of data bearing thereupon. The whole subject is highly technical ; therefore it is proposed to give only a brief account of methods and some summary of the practical outcome of their application. For fuller detail the reader is referred to the admirable article by James and Williams,[43] to the chapter in the second edition of Mackenzie's book by Thomas Lewis,[44] and to the Jerome Cochran Lecture by Lewellys F. Barker.[45]

The principles of electrocardiography may be briefly stated thus : (1) A contracting muscle is comparable to a galvanic cell ; the active end of the muscle is the negative pole, the passive end is the positive, and a current passes through the muscle, as through the cell, from positive to negative, that is, from passive to active. It follows that

when the contraction wave reaches the middle of the muscle there is no current; and that as it passes this equator the direction of the current becomes reversed. (2) These "action-currents" are set up in the heart-muscle in the course of each rhythmic contraction, and can be "led off" from the body by attaching suitable electrodes. Different "leads" are used; the best leads off from the right arm or hand (corresponding to the base of the heart) and from the left leg or foot (corresponding to the apex). (3) By connecting these electrodes with a delicate recording instrument (it is the delicacy of Einthoven's string galvanometer which has made electrocardiography applicable to clinical research) graphic records of the variations in the electrical potential of the heart may be obtained. The record yielded by a normal cardiac cycle is appended (*Fig.* 21) with the lettering used by Einthoven. (Kraus and Nicolai, who have written a book on the subject, use a different lettering, which has no advantages and leads to confusion.) *P* corresponds to auricular systole; *R* to ventricular systole; *T* to systole of the basal musculature of the ventricles at the origin of the aorta and pulmonary artery (Gotch[46]). The significance of *Q* and *S* is doubtful.

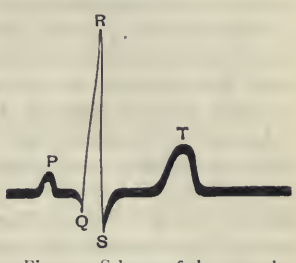

Fig. 21.—Scheme of the normal electrocardiagram

The limitations of such a method are many; for, though the apparatus may be connected by wires with a patient a mile away, still the quietness which is necessary, the absence of vibration which must be ensured, and the extreme care which the technique involves, render the method unsuitable for general clinical use apart from a large and well-equipped institution. This much is certain, however, that by its means invaluable data as to the time-relations of the movements of the several cardiac chambers have already been gained. It is also possible that useful information as to the influence of various lesions on the duration and force of auricular and ventricular systole may be obtained. For example, Steriopoulo[47] finds heightening of the auricular peak *P* in mitral stenosis, and of the ventricular peak *R* in aortic regurgitation; the latter peak is reversed in direction, pointing downwards, in certain congenital malformations, such as pulmonary stenosis. Pribram[48] also points to increase in the auricular peak in cases of emphysema of the lungs. He warns us, however, against generalizations as to the amplitude of these peaks and variations therein.

Arrhythmia.—The subdivision adopted in last year's *Annual* will be followed here.

Extrasystoles.—Lewis's[49 50] electrocardiographic studies have established the following points. Each type of extrasystolic contraction has its own characteristic electric complex, and therefore its own electrocardiogram, according to the spot in auricle or ventricle at which

the abnormal stimulus arises; but the curves may be confused by superimposition of one type of extrasystole upon another. The abnormal curve may remain constant in the same person for months or even years, proving that in such a person the extrasystole always arises by stimulus production at one definite focus. The abnormal experimental stimulation of the auricle produces records roughly divisible into three groups, according to the zone of auricle stimulated, whether upper, middle, or lower. The upper zone complexes most nearly resemble normal records. These abnormal experimental records correspond so closely with those from clinical examples of auricular extrasystole that it is possible to say roughly in which zone of the auricle such clinical extrasystoles arise. The nature of the ventricular response to this premature auricular stimulation varies with the moment of ventricular diastole at which the abnormal stimulus passes over from auricle to ventricle.

Lesions of Conductivity: Heart-block.—Many observations bearing on these matters have been recorded during the year. Brockbank[37] attacks the belief, too readily accepted, that lengthening of the *a-c* interval in the jugular tracing means delay of conductivity through the auriculo-ventricular bundle. This interval, which is the time elapsing between the beginning of the wave *a* corresponding with auricular systole and the wave *c* corresponding with the arterial pulse wave, and normally equal to $\frac{1}{5}$ second, includes the time occupied by (1) auricular systole, (2) conduction of the stimulus through the path joining auricle to ventricle, (3) the presphygmic interval (between the beginning of ventricular systole and the opening of the aortic valves), (4) conduction of the pulse-wave. Brockbank shows that, as factor (1) at least is a variable quantity, it cannot be asserted that the *a-c* interval varies directly as factor (2), factors (1), (3) and (4) being constant. Gossage[51] records a case in which ventricular sometimes failed to follow auricular systole, due (he thinks) to deficient excitability on the part of the ventricle, and not to any interference with the conduction of the stimulus from auricle to ventricle, as the *a-c* interval was normal.

Many papers bear on the great questions: Is failure of conductivity from auricle to ventricle always due to a lesion of the heart muscle, and never entirely due to nervous influences interfering with conduction? And if so, is it only a lesion of the auriculo-ventricular bundle of His that can interfere with conductivity? As to the neurogenic element in heart-block, it is generally agreed that when digitalis causes dropping of the ventricular sequence, it does so by action through the vagus. But there are those who would claim a greater importance for the nervous factor than the majority are disposed to concede (Kronecker,[52] Goodhart,[53] Debove[54]). On the other hand, there are investigators who bring forward experimental and clinical observations proving the intimacy of connection of heart-block with disease of the cardiac muscle, and particularly with disease of the atrio-ventricular bundle of His; note the clamp experiments of

Erlanger and Blackman,[55] the section experiments of Eppinger and Rothberger ;[56] and the cases recorded by Bishop[57] and by Rostaigne,[58] in which heart-block noted in life was found after death to have been associated with gross disease of the auriculo-ventricular bundle. Then there are various observations which seem to prove, though not so conclusively, the connection between heart-block and lesions of the *a-c* bundle. There is, for example, the case of Stokes-Adams syndrome recorded by Beck and Stokes[59] of diffuse purulent myocarditis, one of the foci being found post mortem in connection with the bundle of His. In this case, however, the symptoms of heart-block had been present for some months, and must therefore have been due either to preceding lesions of the same type as that found post mortem, or else to some quite different change. Again, a case of ulcerative endocarditis is recorded by Cowan and others,[60] in which a prolongation of the *a-c* interval was noted ; post mortem, several spots of inflammatory leucocytosis were found in the *a-v* bundle. The observations of Sapegno[61] and of Löw[62] need to be recollected in connection with these cases. The first-named found inflammatory lesions of the auriculo-ventricular bundle in a high percentage of 72 hearts from cases of sudden death ; and the latter, in an examination of 200 hearts from various cases, found cellular infiltration and fatty change of the bundle in the infective diseases. It is probable, therefore, that in a number of cases small inflammatory lesions occur in the *a-v* bundle without interfering with conductivity. In other cases, again, there is a strong probability that the observed phenomena of damage to conductivity were due to myocardial disease or disorder even in the absence of post-mortem data ; witness the cases of heart-block following rheumatic fever recorded by MacDonald Gill,[63] Cowan and others,[64] Magnus-Elsleben,[65] and Emanuel,[66] and the observations of a heart-block independent of vagal influences, occurring in asphyxia, and recorded by Lewis and Mathison.[67]

There is, however, another group of cases in which the causation of an undoubted heart-block cannot be finally explained. Armstrong's[68] patient, a boy of five, who developed heart-block with epileptiform attacks and a mitral murmur shortly after a fall on the head and symptoms suggestive of meningitis ; Earnshaw's[69] case of complete block with severe Stokes-Adams attacks lasting over a year, then recovering completely and to all appearance permanently ; Krumbhaar's[70] man of sixty-five, with complete block and syncopal attacks extending over years, in whom post-mortem examination showed only the slightest fibrosis of the bundle of His and no other change ; the family described by Fulton, Judson, and Norris,[71] with definite heart-block in the father and two or three out of four children, not influenced by atropine and therefore not vagal in origin ; Esmein's[72] case of Stokes-Adams syndrome apparently due to the pressure of a glandular tumour in the mediastinum on the vagus ; and Herrick's[73] three patients, one of whom, a case of complete heart-block, with Stokes-Adams attacks, recovered completely—such a group makes one feel that much is still awaiting

explanation before we can consider the pathogenesis of heart-block as fully understood. As if to accentuate the obscurity of this problem, we have records such as that of Martin and Klotz,[74] of a case of mediastinal sarcoma invading the heart, replacing about two-thirds of the cardiac muscle, and completely destroying the auriculo-ventricular bundle, without causing any disturbance of cardiac rhythm.

Absolute Irregularity (the "Nodal" rhythm).—The bracketed name implies a pathogenesis provisionally proposed by Mackenzie to explain the total cardiac irregularity (both as to force and to frequency) which is often seen in cases of advanced heart disease, and especially of mitral stenosis. He suggested that in such cases the initiation of the heart's rhythm had changed its site from the sino-auricular node at the entrance of the great veins into the right auricle, to the auriculo-ventricular node at the junction of auricle with ventricle. From this point, it was suggested, stimuli travelled into both auricle and ventricle, which therefore contracted together; this accounted for the absence of a separate auricular wave from the jugular tracing. Lewis's[75] splendid paper has, however, provided us with a more satisfactory hypothesis, founded upon both clinical and experimental evidence. His clinical researches with electrocardiographic apparatus show a characteristic curve in such cases, the ventricular elements of which are normal; but the normal auricular peak is absent, and its place is taken by "a series of rapid oscillations which are superimposed upon the rest of the curve and deform it." By suitable electrical stimulation of the auricle in dogs, "auricular fibrillation" can be set up; the polygraphic and electrocardiac records of a heart thus affected are closely similar to those obtained in the clinical condition of absolute irregularity. Add to this the fact that in some cases of absolute irregularity the jugular tracings show signs of a series of small movements in the place of the normal auricular wave, and it is clear that Lewis has very strong evidence for his theory that absolute irregularity of the ventricular action is caused by a fibrillating auricle; that is to say, the stimulation of the auricle does not start from one point and sweep through the wall of the whole chamber in an orderly sequence, but there are stimuli at various points in the auricular wall which cause independent contractions jostling one another, and pass over haphazard into the ventricle, which is therefore stimulated in an absolutely irregular fashion. Similar electrocardiac researches have tended to confirm this theory, according to Rothberger and Winterberg,[76] and it is also supported by some experiments of Rihl.[77] Of course we have yet to discover what is the cause of auricular fibrillation in cases exhibiting an absolute arrhythmia. This question cannot be answered satisfactorily yet; but one or two observations bearing on the subject may be briefly noticed. First, there are the cases recorded by Fox[78] which show that "perpetual" total irregularity may be preceded by transitory periods of the same disorder, an observation confirmed by Hay[79] in a very interesting paper on the senile heart. Hewlett,[80] writing about one of Fox's cases, brings evidence to show

that auricular fibrillation may be developed by gradual stages, from single auricular extrasystoles to multiple ones, and thence to fine auricular fibrillation. Then we must also retain for future use the fact that failure of auricular contraction is not necessarily accompanied by persistent total irregularity of the ventricle, as Laslett's[81] case shows (see also remarks by v. Tabora and others at the German Congress of Internal Medicine[82]).

Paroxysmal Tachycardia.—Lewis[83] concluded from experiments on dogs, that paroxysms of tachycardia following ligature of the coronary arteries were initiated in the wall of the ventricle by muscular changes; and in a clinical case[84] that the fast rhythm arose from some point in the middle zone of the auricle. Marris[85] describes a case in which he says that the paroxysms were generated from at least two separate foci in the auricular wall. It would appear, therefore, that paroxysmal tachycardia may be caused by stimuli arising in various abnormal parts of the cardiac muscle. Turner[86] records the case of a girl whose paroxysms, previously frequent, stopped absolutely and permanently after an attack of herpes zoster in the area supplied from the second left dorsal segment of the cord. In McKendrick's case[87] the attacks of tachycardia were associated with profuse salivation.

Treatment.

Michell's[26] recommendations as to the treatment of *cardiac over-stress* are based upon the belief that simple strain does not inflict lasting damage on any otherwise healthy heart. He enjoins **Rest** in bed in every case that requires treatment at all. Arterial pressure is to be reduced by a **Hot Bath,** and by **Diuretin,** the initial dose being 15 gr. The return to normal activity should be carefully graduated; tea, coffee, alcohol, and tobacco must not be allowed. The relative anæmia which is often quickly established in connection with cardiac over-strain should be treated by administering **Manganese Glycerophosphate** with **Hæmoglobin.** The frequent low-tension pulse noted in some patients indicates the use of **Digitalin** with **Strychnine.** If this causes extrasystoles with cardiac discomfort, **Cereus Mexicana** may be useful.

Buchanan,[88] writing of cardiac apart from aortic *syphilis,* says that mercurial and iodide treatment should be pushed, in spite of the presence of dropsy and albuminuria, which are not to be regarded as contraindications.

The treatment of active *cardiac rheumatism* in children must, according to Carr,[89] include complete **Rest** in bed for a period of three to six weeks, followed by gradual convalescence; no active exercise to be allowed till after the sixth month. During the period of rest in bed the diet must be light and the bowels regulated. **Salicylates** should be given; Carr has no particular preference for either aspirin or sodium salicylate, and considers their action rather disappointing. He uses **Caton's Blisters,** and gives **Potassium Iodide** in the hope of influencing favourably the progress of valvular fibrosis. For threatening cardiac failure, **Strychnine, Caffeine,** and **Brandy** are

recommended ; the use of digitalis is contraindicated. In convalescence cod-liver oil is useful, but not iron. Where pericarditis is manifest, applications of ice are recommended ; it is interesting to find Carr confirming the opinion expressed by others (*see* PERICARDITIS) to the effect that rheumatic infection never causes a pericardial effusion large enough to need tapping. Nobécourt[90] says that every child with acute rheumatism, no matter how mild the attack, should remain in bed and take sodium salicylate. Absolute rest is especially to be enforced in cases exhibiting definite signs of carditis, as the slightest movement may bring on syncope. An exclusive milk diet, or a diet of vegetables and milk, is advised ; the bowels are to be kept regular, and precordial pain should be treated locally with sinapisms and cupping, or with ice in compresses or bags. **Salicylates** should be given, and the combination of these with alkalies is at least harmless. Convalescent patients must be kept under supervision and treated with arsenic, iodides, and mineral waters. Exercise especially calls for careful management.

Cowan,[91] in discussing the treatment of *infective endocarditis*, groups cases of this disease under three headings: (1) Those in which organisms can be cultivated from the circulating blood ; in such he has found vaccine and serum treatment ineffective. (2) Rheumatic cases, in which the administration of full doses of salicylate, with alkalies, is recommended. (3) Those cases in which blood cultures are negative and which from general considerations appear connected with rheumatic infection, cases of the " chronic infective endocarditis " type alluded to earlier in this article. In this latter group he finds salicylate treatment a failure, but considers that the injection of **Collargol** may be useful. Schottmüller,[14] in his account of similar cases, has not found collargol of any use. Cases of this type are in fact peculiarly disappointing, for their very gradual progress often leads the observer to a consoling belief in the possibility of recovery, a hope always belied by the final issue of events. Judd[92] records one case in which a diagnosis of infective endocarditis was made, though without confirmation in the shape of blood cultures or petechiæ ; recovery followed the use of diphtheria antitoxin !

Cardiac Tonics.—Research during the year has attacked the problem of cardiac tonics from two sides. Some aim at defining more clearly the action, uses, and limitations of digitalis, while others seek to discover some satisfactory substitute for the crude drug, either by isolation of its own active principles or by the use of some other substance with a similar action.

The investigations which aim at a better understanding of the action of the digitalis group are, we learn, to be supplemented and enriched by systematic study at the Mount Vernon Hospital, London, under the guidance of Dr. James Mackenzie.[93] His article on the subject includes a schema for the registration of data which might well be adopted by other clinics.

Colbeck[94] discusses the position which **Digitalis** should occupy in

the treatment of that group of cardiac cases associated with arterial degeneration and high blood-pressure. He points out that in such cases the function which is usually most impaired is that of contractility ; cardiac pain and dyspnœa are provoked by exertion more and more readily as contractility becomes more and more depressed. Tonicity is not damaged, at least not at the outset, and there is therefore no dilatation. In many cases, however, tonicity becomes depressed in the course of the disease ; the ventricles dilate, the blood-pressure falls, cardiac pain disappears, dyspnœa becomes continuous, and œdema is established. It is in such cases as these that digitalis is pre-eminently indicated. In cases where tonicity does not fail, digitalis should not be given except as an emergency drug in combating syncopal attacks.

Hare,[95] in reviewing the use of digitalis in cases of mitral stenosis with decompensation, makes a special point of the action of the drug on conductivity. He says that if polygraphy shows a lengthening of the *a-c* interval in such cases, full doses of digitalis are contra-indicated ; and still more so if there be a ventricular venous pulse. " If given at all, the dose must be so small as to produce a very gradual effect, one which will not consist in decreasing auricular contraction through vagus stimulation, but gently re-establish general cardiac power. . . . The question naturally arises, if not digitalis, what else ? The answer would seem to be that in such a case as that just described we should give the patient absolute rest, unload the portal system by free purgation, use venesection, it may be, to relieve stasis, and give rapidly-acting diffusible stimulants for a few hours until the co-ordination of cardiac movement is re-established. When this is done, small doses of digitalis, arsenic, and iron may be used to restore cardiac tone."

The researches of Rubow[96] show that while it is possible to give digitalis continuously over long periods without ill effect, such a course is of little value in preventing breakdown of compensation in cases of chronic cardiac disease. He gave doses of the powdered leaves varying from 10 to 125 mgrams, according to the weight of the patient, for periods of four to five days, interrupted by periods of one to three days. Barringer and Hewlett[97] have observed an experimental and clinical action of digitalis on the cardiac rhythm which makes a slow pulse an insecure index of recent digitalis administration ; they have found that while it is producing complete auriculo-ventricular dissociation it may at the same time quicken the independent ventricular rhythm, so that the pulse is not slower than normally. The experiments of Eppinger and Hess[98] go to prove that digitalin exercises its vaso-constrictor effect on the coronary arteries as well as on peripheral vessels.

The effort to find a substitute for crude digitalis has been prompted not merely by the variability of preparations alluded to at some length by Fornara,[99] but also by its cumulative action, by its liability to irritate the mucous membranes of the alimentary tract after oral administration and the subcutaneous tissues after hypodermic injection,

and by the inconveniently long latent period which intervenes between administration and action. Many have tried to combat these by isolation of one or more of the active principles, digitalin, digitalein, and digitoxin. Of these, the last is the most powerful, but it is highly toxic. Cloetta brought forward **Digalen** as a non-toxic form of digitoxin, but it is probably digitalein (Kiliani). W. Hale[100] has subjected it to the test of experiment, and concludes that it is not a uniformly stable preparation. Digalen is relatively much less potent than corresponding amounts of crystalline digitoxin, but is of about the same activity as digitalein. The experience of clinicians indicates that digalen is much less effective than is claimed, and that the secondary action of the digitalis group appears equally often after its use as with the older and cheaper galenicals. Its use in cases of acute heart failure, whether by intramuscular or intravenous injection, seems to open serious objection (on account of the pain and danger of thrombosis), and it would apparently be better practice in such cases to use either strophanthin given intramuscularly, or one of the preparations of the suprarenal glands by intravenous injection.

Grober[101] thinks digalen shows cumulative tendencies and a long latent period; subcutaneous injection may cause abscesses. In cases of acute cardiac breakdown the dose is 1 cc. three times daily for two days, then reduced to ·5 cc. for a few more days; in chronic cases 10 drops or less, three times daily; and as an emergency 1 to 2 cc. may be given intravenously (not, however, without risk of thrombosis). Another new digitalis preparation is **Digipuratum**; this is very carefully prepared from digitalis leaves in such a way that superfluous constituents are got rid of, and digitalin and digitoxin are retained in fairly constant proportions. Both Grober and W. Hale[102] consider that it is reliable as to composition, but they find it not free from the cumulative action of crude digitalis; and Hale says its superiority is not great enough to justify the additional expense.

Of the other members of the digitalis group, **Strophanthin** still continues to attract a good deal of attention. Grober (loc. cit.) recommends it for emergency use in cases of cardiac breakdown, especially if the myocardium be relatively healthy; the dose should be 1 mm. (= one of Bohringer's tubes) except in cases already treated with digitalis, in which case the dose should be smaller. It is given by intravenous injection. It is of no use in cases of nephritis. Henderson[103] also considers it contraindicated in the cardiac weakness of intense intoxications (toxic pneumonia, septicæmia, etc.). Its advantages as an emergency drug in cardiac decompensation are its quickness of action, the efficacy of a single dose, and the avoidance of gastric or subcutaneous irritation. Stone[104] says that the immediate effect of injection of strophanthin is to increase the amplitude of the pulse-wave, shortly followed by slowing of the heart. In cases of broken compensation with a quick low-tension pulse, the injection will therefore give relief which will last three days or longer, with free diuresis. He cautions against its use in patients who have taken

digitalis, and in patients with bradycardia. High tension is not necessarily a contraindication. The injection must not pass into the wall of the vein or into the surrounding tissues. Danielopolu[105] also warns us against the use of strophanthin after digitalis, as it has led to fatal accidents. He advises a smaller dose of ·2 to ·4 mgram for patients with myocardial disease, and for any who have within the preceding three or four days taken digitalis; more than one dose in twenty-four hours should never be given. Hatcher[106] pleads for uniform physiological standardization of strophanthin by means of a "cat unit"; he has found lack of uniformity in the action of different samples of strophanthin (which is issued by Bohringer in tubes, each of which contains a single dose of 1 mgram), and amorphous strophanthin is more toxic than the crystalline form.

A drug which suggests the desire of the manufacturer to accommodate all parties is **"Digistrophan,"** recommended by Boelke.[107] It is given three times daily in tablets, each of which contains ·1 gram of digitalis leaves and ·05 gram of strophanthus seeds. It is not cumulative, does not upset the stomach, and is stable in composition, according to Boelke. Its action may be measured by the diuresis it produces; if it is desired to obtain a further diuretic effect, the compound may be given in tablets which also contain caffeine-sodium acetate or sodium acetate.

The paper by Dale and Laidlaw[108] adds greatly to the precision of our knowledge of **Apocynum,** a drug which is considered by some to be the most efficacious member of the digitalis group. According to their researches, the active principle is a crystalline non-glucosidal substance, which has been variously called cynotoxin and apocynamarin. The action is cardiotonic and vasoconstrictor; in the latter particular it is more powerful than strophanthus, in the former only slightly less so. It induces diuresis. The action is rapid, and it should therefore be used cautiously for subcutaneous injection. The body rapidly destroys it, so that its action is not cumulative. It has manifest irritant effects when given orally or under the skin.

Luxuries as Remedies in Cardiac Disease.—Under this alluring title Herz[109] writes about the possibility of using alcohol, coffee, and tobacco as remedial measures in cardiac disease. He says that the tedium of confinement to bed is alleviated by a daily glass of light wine, and that appetite may be enhanced by draughts of sweetened wine and warm water. In arteriosclerotic cases with nocturnal dyspnœa, brandy is useful, especially as an addition to a milk diet; it may also be used in the treatment of angina. The hypnotic action of alcohol may be utilized by giving it in the form of beer, or as rum in milk. Black coffee can be given for its cardiotonic effect, or to reinforce the diuretic action of digitalis. It should not be given at night, and it is contraindicated in cerebral arteriosclerosis as well as in cardiac neuroses. Lastly, denicotinized tobacco may be allowed, with caution, to smokers who, having been deprived of tobacco, experience abdominal discomfort and become constipated.

Puncture of the Heart was practised by Milne[110] in a case of rheumatic heart-disease with ventricular dilatation and mitral incompetence. The patient had become pulseless and almost unconscious. The veins of both arms and the brachial artery of one side having been opened without drawing blood, Milne punctured the heart at the inner end of the fifth left interspace with a trocar and cannula the size of a No. 3 soft catheter. Blood, thick like porter, issued in jets. The patient revived, cyanosis disappeared, the arterial pulse returned, and the cut veins bled; death, however, followed after four hours of comparative comfort. Apparently there was no hæmorrhage into the pericardium, for the cardiac dullness was diminished after puncture. Milne is encouraged by this "Pyrrhic victory" to expect a wide usefulness for this form of emergency treatment.

"Bloodless Venesection" can be effectively practised, according to v. Tabora,[111] by entrapping venous blood in the limbs by means of elastic bandages just tight enough to compress the veins; too sudden relaxing of these is dangerous. The treatment is indicated in cases of cardiac breakdown with pulmonary œdema, whenever actual venesection is impossible. In such cases v. Tabora has found a very distinct rise in peripheral venous pressure; and a pint of blood has to be withdrawn to give any relief in such cases.

Symptomatic.—Huchard,[112] writing of *cardiac cough*, says that in cardiac patients, especially in cardiosclerotics, a persistent dry cough is common. It gets worse, till expectoration slightly tinged with blood may appear; this foreshadows the onset of pulmonary œdema. He recommends treatment by **Milk Diet,** or by **Dechloridated** diet with administration of **Theobromine,** and withdrawal of blood. Foot-baths repeated two or three times daily are also useful; the lower limbs should be immersed to the knees in water at 40° to 45° C. for two or three minutes; then in water at 20° C. for half to one minute; finally in water at 40° C. for two or three minutes.

In a case of *cardiac discomfort*, paroxysmal in nature and associated with extrasystoles, in a medical man, Koblanck[113] was able to give great relief by removal of nasal polypi and application of **Trichloracetic Acid** to the septum, after all other means had failed. Lastly, W. Gordon[114] records a case of tachycardia following abdominal injury, which was cured by the application of a **Tight Abdominal Binder.**

For further reference to drug treatment see **Alcohol** in cardiac failure (*page* 5); **Cratægus oxyacantha,** useful in weak, irritable heart following influenza, and in neurasthenia (*page* 24); **Gynoval** in cardiac neuroses (*page* 31); **Ouabain,** especially in mitral regurgitation (*page* 42); **Pituitary Extract** in disturbed action due to toxæmia or influenza (*page* 47); **Strophanthin** in (*page* 53).

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and 29, 1910 ; [15]*Lancet*, Oct. 16, 1909 ; [16]*Ibid.* Jan. 15, 1910 ; [17]*Bost. Med. and Surg. Jour.* June 30, 1910 ; [18]*Amer. Jour. Med. Sci.* Nov. 1909 ; [19]*Wien. klin. Woch.* No. 4, 1910 ; [20]*Jour. Amer. Med. Assoc.* Oct. 23, 1909 ; [21]*Lancet*, Ap. 15, 1910 ; [22]*Med. Chron.* Feb. 1910 ; [23]*Quart. Jour. Med.* Jan. 1910 ; [24]*Wien. klin. Woch.* May 26, 1910 ; [25]*Lancet*, Dec. 11, 1909 ; [26]Allbutt's *System*, 1909 ed. vol. vi. p. 193 ; [27]*Brit. Med. Jour.* Sept. 25, 1909 ; [28]*Jour. R.A.M.C.* June, 1910 ; [29]*N.Y. Med. Rec.* Aug. 28, 1908 ; [30]*Ibid.* Nov. 13, 1909 ; [31]*Gaz. d. Hôp.* No. 16, 1910 ; [32]*Brit. Med. Jour.* June 4, 1910 ; [33]*Arch. Int. Med.* 1909, iv. 4 ; [34]*Sem. Méd.* Feb. 9, 1910 ; [35]*Med. Press*, Dec. 15, 1909 ; [36]*Wien. klin. Woch.* Apr. 19, 1910 ; [37]*Quart. Jour. Med.* July, 1910 ; [38]*Brit. Med. Jour.* 1909, ii. p. 509 ; [39]*Ibid.* Oct. 16, 1909 ; [40]*Jour. Amer. Med. Assoc.* May 21, 1910 ; [41]*Heart*, ii. 1, p. 15 ; [42]*Rev. de Méd.* Aug. 1910 ; [43]*Amer. Jour. Med. Sci.* Sept. 1910 ; [44]Mackenzie's *Dis. of Heart*, 2nd ed. p. 370 ; [45]*Johns Hop. Hosp. Bull.* Oct. 1909 ; [46]*Heart*, i. 3, p. 235 ; [47]*Deut. med. Woch.* June 16, 1910 ; [48]*Prag. med. Woch.* No. 30, 1910 ; [49]*Brit. Med. Jour.* Mar. 26, 1910 ; [50]*Heart*, ii. 1, p. 23 ; [51]*Ibid.* i. 4, p. 283 ; [52]*Brit. Med. Jour.* July 23, 1910 ; [53]*Lancet*, Sept. 10, 1910 ; [54]*Gaz. d. Hôp.* Ap. 28, 1910 ; [55]*Heart*, i. 3, p. 177 ; [56]*Zeits. f. klin. Med.* vol. 70, pt. 1 ; [57]*Amer. Jour. Med. Sci.* Jan. 1910 ; [58]*Med. Press*, July 20, 1910 ; [59]*Jour. Amer. Med. Assoc.* Sept. 24, 1910 ; [60]*Quart. Jour. Med.* Oct. 1910 ; [61]*Arch. p. l. Sci. Med.* xxxiv. pts. 1 and 2 ; [62]*Sem. Méd.* Ap. 20, 1910 ; [63]*Austral. Med. Gaz.* July 20, 1909 ; [64]*Quart. Jour. Med.* Jan. 1910 ; [65]*Zeits. f. klin. Med.* vol. 69, pts. 1 and 2 ; [66]*Lancet.* Mar. 26, 1910 ; [67]*Heart*, ii. 1, pp. 57, 64 ; [68]*Liver. Med.-Chir. Jour.* July, 1910 ; [69]*Amer. Jour. Med. Sci.* Ap. 1910 ; [70]*Arch. Int. Med.* June, 1910 ; [71]*Amer. Jour. Med. Sci.* Sept. 1910 ; [72]*Sem. Méd.* June 29, 1910 ; [73]*Amer. Jour. Med. Sci.* Feb. 1910 ; [74]*Ibid.* Aug. 1910 ; [75]*Heart*, i. 4, p. 306 ; [76]*Wien. klin. Woch.* June 17, 1909 ; [77]*Zeits. f. exper. Path.* etc. vii. 3, in *Münch. med. Woch.* June 7, 1910 ; [78]*N.Y. Med. Rec.* May 28, 1910 ; [79]*Liver. Med.-Chir. Jour.* July, 1910 ; [80]*Bost. Med. and Surg. Jour.* June 30, 1910 ; [81]*Quart. Jour. Med.* Ap. 1910 ; [82]*Deut. med. Woch.* May 12, 1910 ; [83]*Heart*, i. 2, p. 98 ; [84]*Ibid.* i. 3, p. 262 ; [85]*Ibid.* ii. 1, p. 74 ; [86]*Brit. Med. Jour.* Oct. 9, 1909 ; [87]*Glasg. Med. Jour.* Dec. 1909 ; [88]*Med. Press*, Feb. 16, 1910 ; [89]*Pract.* Nov. 1909 ; [90]*Arch. de Mal. des Enf.* xiii. 7, p. 481 ; [91]*Proc. Roy. Soc. Med.* 1910 (Therap. Sect.), p. 101 ; [92]*Brit. Med. Jour.* Jan. 1910 ; [93]*Heart*, ii. 1, p. 9 ; [94]*Pract.* Mar. 1910 ; [95]*Ther. Gaz.* Ap. 15, 1910 ; [96]*Sem. Méd.* June 1, 1910 ; [97]*N.Y. Med. Rec.* Nov. 13, 1909 ; [98]*Sem. Méd.* Sept. 22, 1909 ; [99]*Policl.* (Sez. Prat.), Sept. 1909 ; [100]*Jour. Amer. Med. Assoc.* Jan. 1, 1910 ; [101]*Brit. Med. Jour.* Epit. Nov. 27, 1909 ; [102]*Jour. Amer. Med. Assoc.* Jan. 8, 1910 ; [103]*Amer. Jour. Med. Sci.* Sept. 1910 ; [104]*Bost. Med. and Surg. Jour.* Oct. 18, 1909 ; [105]*Rev. Stiintzeor. Med.* Feb. 1910, in *Münch. med. Woch.* May 26, 1910 ; [106]*Jour. Amer. Med. Assoc.* Mar. 26, 1910 ; [107]*Ther. d. Gegenw.* 1910, vi. 153 ; [108]*Heart*, i. 2, p. 138 ; [109]*Med. Press*, Sept. 21, 1910 ; [110]*Lancet*, Aug. 6, 1910 ; [111]*Münch. med. Woch.* June 14, 1910 ; [112]*Jour. d. Prat.* No. 12, 1910 ; [113]*Deut. med. Woch.* No. 8, 1910 ; [114]*Brit. Med. Jour.* Mar. 12, 1910 ; [115]*Amer. Jour. Med. Sci.* Oct. 1909.

HEELS, PAINFUL. (*See* EXOSTOSIS.)

HEMIPLEGIA, ORGANIC (Corroborative Signs in).

Purves Stewart, M.D., F.R.C.P.

In most cases the diagnosis between organic and functional hemiplegia is comparatively easy. In a small proportion of cases, however, a hysterical hemiplegia, especially if associated with spastic phenomena, may simulate the organic variety more or less closely. It may therefore be useful to call attention to certain minor signs which occur only in organic cases.

Firstly, we have the "*interosseal*" or "*finger*" *phenomenon*

described by Souques.[1] In order to demonstrate this, we ask the patient to raise his paralyzed arm. As he does so, we notice that he involuntarily extends the fingers at the proximal phalanges, and spreads them out in a fan-like fashion. This is due to spasm of the interossei. When he lets the limb drop again, the fingers resume their original flexed attitude. Of course, to demonstrate this phenomenon, the patient must have sufficient residual power to enable him to raise the limb; it is absent when the hemiplegia is absolute. This interosseal phenomenon is analogous to Strümpell's *tibialis phenomenon* in the lower limb, consisting in contraction of the tibialis anticus when the patient flexes the hip on the hemiplegic side.

In most cases of hemiplegia with contracture, we can demonstrate another sign—the "*thumb*" *sign*, which does not occur in hysterical contracture. This was pointed out by Klippel and Weil,[2] and consists in an involuntary flexion of the thumb when the other contractured fingers are passively extended. In a normal individual at rest, with the forearm relaxed, and the fingers in a position of gentle semi-flexion, if we slowly press back the four fingers, we often notice that the thumb, left to itself, becomes slightly extended. Sometimes it does not move; but in any case it never becomes flexed. This thumb sign only occurs in organic hemiplegia accompanied by contracture, not in flaccid hemiplegia.

If an organic hemiplegia be flaccid in type, we do not find the "interosseal" or the "thumb" phenomenon. On the other hand, we look for the "*hand*" *phenomenon*, and the sign of "*associated adduction*" to which Raimiste[3] has called attention. We elicit this "hand" sign by making the patient rest his paralyzed elbow on a table or bed. We then raise the forearm and hand to a vertical position, holding the paralyzed hand in line with the forearm. Then, when the patient's attention is diverted, we very gently slip our supporting hand proximally along the limb, so as now to support it by the forearm. At once the paralyzed hand, devoid of support, falls, and forms with the forearm an angle of 130° to 140°. This fall of the hand occurred in fifty successive cases of flaccid hemiplegia examined by Raimiste. It never occurs in health. Moreover, this hand sign can be demonstrated immediately after an attack of hemiplegia, during the initial flaccid stage, and whilst the patient is yet comatose. It is therefore of considerable value in deciding which is the paralyzed side. The onset of contracture abolishes the phenomenon. The hand phenomenon does not occur in normal individuals either during sleep or when under a general anæsthetic. In such individuals, if the hand and forearm are placed vertically in line, they remain so when support is withdrawn from the hand. Nor does the hand sign occur in flaccid hysterical paralysis.

Passing to the lower limb, here again we have one or two signs which are pathognomonic of organic hemiplegia. One of these, described originally by Raimiste,[4] is the "associated abduction-adduction" sign. This consists in an involuntary movement of abduction (or

adduction as the case may be) in the paralyzed limb when one makes the patient abduct (or adduct) the non-paralyzed limb against resistance. The patient should be lying on his back. We forcibly hold the healthy foot, and tell the patient to try and pull it away from (or towards) the paralyzed limb. This being impossible, owing to our resistance, the paralyzed limb involuntarily makes a corresponding movement of abduction (or adduction). "Associated abduction or adduction" does not occur in normal individuals nor in cases of hysterical hemiplegia. Another sign in the lower limb has been pointed out by Neri,[5] not connected with "associated" movements of any sort, but due to the hypertonicity of the flexor muscles of the hemiplegic knee. The patient is laid flat on his back. The non-paralyzed lower limb is then passively flexed at the hip, the knee remaining extended (as in stretching the sciatic nerve by Lasègue's well-known method). On the healthy side, the limb can be passively elevated to an angle of 70° or 75°, whereas, on the hemiplegic side, the maximum angle is 40° to 50°. The phenomenon can also be elicited with the patient standing up, his feet being apart. On telling him to bend the trunk forwards towards the horizontal, we note that the healthy knee remains extended, whilst the paralyzed one becomes flexed.

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HERNIA. *John B. Deaver, M.D., LL.D.* / *D. B. Pfeiffer, A.B., M.D.* } *Philadelphia.*

Inguinal hernia in the female is the subject of an extensive inquiry by William B. Coley.[1] At the Hospital for Ruptured and Crippled in New York City, they have had during the last twenty years 59,404 cases of inguinal hernia, of which 9,082 were in the female. The present paper is based on an analysis of 1,692 cases. A special effort was made to ascertain in how many cases of hernia in adult life the hernia had existed in infancy or early childhood. The statistics showed that such was the case in 6 per cent of the cases. It seems probable that in a very considerable number of other cases the hernia had actually been present in infancy or childhood, but had been forgotten in the long interval that had elapsed. In regard to the contention that direct hernia in the female is even more frequent than in the male, Coley states that in his personal experience only 1·2 per cent of the cases of inguinal hernia in adult females upon whom he had operated showed the direct type of hernia. This is contrasted with 5·5 per cent of direct hernias in adult males, which would make direct hernia occur five times more commonly in the male than in the female. His belief is that the canal of Nuck is a normal development which remains open in all cases in which a hernia subsequently develops, as well as in many other cases that never have a hernia. This congenital process of peritoneum by its failure to close he regards as the great and all-important cause of inguinal hernia in the female as well as in the male, although in addition there are usually present various exciting causes in the nature of a strain.

Unusual cases are reported, in four of which, aged respectively twelve, six, three, and forty-eight years, the tube and ovary were found in the sac. In one case, aged thirty-five years, strangulated

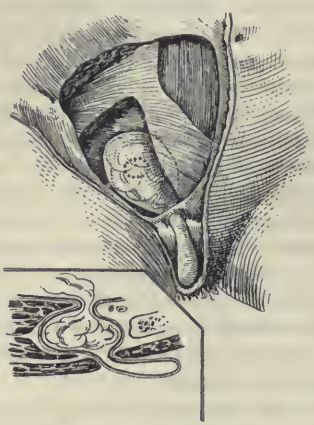

Fig. 22.—Strangulated interstitial hernia in the female.

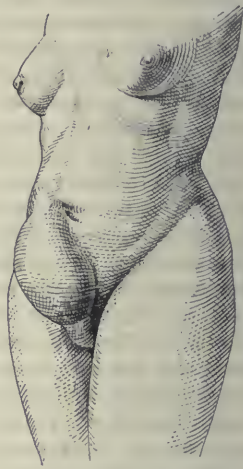

Fig. 23.—Interstitial hernia in the female, associated with hydrocele in the canal of Nuck. (Bull and Coley.)

hernia of the appendix was present. Double direct hernia with the bladder in the right side was noted in a patient fifty-five years old. A case of the excessively rare condition of interstitial hernia is reported in detail (*Figs.* 22, 23).

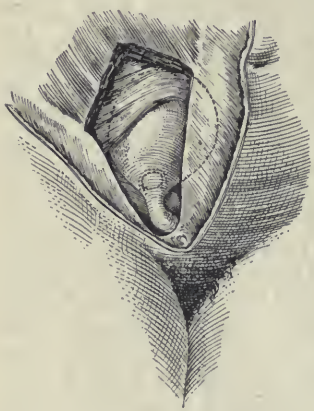

Fig. 24.—Properitoneal hernia (inguinal) in the female.

The patient was forty years old, and gave no history of having had a hernia until three days previously, when a tumour began to form in the right lower abdomen, accompanied by mild symptoms of obstruction. On operation the hernial sac lay, on the outer side, beneath the external oblique aponeurosis and on the inner side partly under the external and partly under both the external and internal oblique and the transversalis fascia beneath, thus being practically a properitoneal hernia. The strangulated bowel recovered, and the patient made a good recovery. The most probable explanation of the development of the hernia is to regard the sac as a diverticulum of congenital origin, though another view is to regard the sac as an acquired one which has taken its peculiar course as

the result of obstruction to its downward course. No such obstruction was noted, however.

A case of true properitoneal hernia also is included. The woman was aged forty, and had had a hernia for a number of years. On operation, as no enlargement of the external ring was found, the femoral ring was investigated, with negative results. Upon opening the aponeurosis of the external oblique, a large hernial sac was found extending upwards, as in *Fig.* 24, beneath the internal oblique muscle and the aponeurosis for at least 3 in. The sac was empty. The neck was situated close to the internal ring. This is only the fourth case of true properitoneal hernia in the female which Coley can find recorded in the literature.

Brunco[2] and Göbell,[3] who have written upon the subject, state that all forms of interstitial hernias should be operated upon in view of the fact that the prognosis is more unfavourable than in simple hernia. One half of Göbell's cases were incarcerated.

Coley seldom advises operation for inguinal hernia in children under the age of three to four years: first, because he prefers to give the child the chance of mechanical cure, and secondly, because there seems to be little risk from strangulation. He has never seen a case of strangulation of an inguinal hernia in the female under the age of fourteen, and should strangulation occur in children, the danger is slight. In twenty cases of strangulated hernia in children in the Hospital for Ruptured and Crippled, there has not been a single death. After the age of three to four years, operation is counselled in practically all cases. The method employed is essentially that of Bassini, without transplantation of the round ligament. It is also sought to preserve this structure if possible. In Coley's personal series of 353 cases, there were no deaths and but two relapses, one of which occurred in a case of strangulation followed by suppuration.

End Results of the Radical Operation for Inguinal Hernia.—C. C. Simmons,[4] in tracing the patients operated upon in the year 1905 at the Massachusetts General Hospital, found that in 113 cases of the radical cure by the Bassini method there were nine recurrences (7 per cent). Two patients died, one being a case of strangulated hernia, the other perishing from sepsis. Ferguson's operation was done twenty times, with three failures, though it should be stated that in two of these no sac was found. Kocher's operation was done three times, without recurrence in two, the result in the third case being unknown.

R. W. Wright[5] reports the results in a number of operations for the radical cure of inguinal hernia performed in the Royal Arsenal Hospital. Of 120 cases it was possible to re-examine 100. Twelve were found to have relapsed. Of the relapses, eleven occurred in the first forty of the series. This was not explained by the greater lapse of time, as in every case but one in which relapse took place it occurred in less than two years after this operation. As the operation employed in every case was a modified Macewen, and the

operators were the same, this difference in outcome suggests forcibly the necessity of accuracy and experience to secure the best results.

Heinzmann[6] relates the outcome of the radical operation according to the method of Girard ; 152 herniotomies upon 132 patients were investigated. There were two immediate deaths in cases of strangulation. In the remaining 150 hernias there were six recurrences (96 per cent free from recurrence). Four of the recurrences took place among the 137 instances of free hernia. Of the thirteen strangulated cases, two were followed by recurrence. The method of Girard, which is strongly recommended on the basis of these results, differs essentially from the Bassini, in that the cord is not transplanted and in a more extensive imbrication of the layers.

Strangulated Hernia.—There is no paper during this year which deals exclusively and extensively with this subject. There were two deaths in Heinzmann's (loc. cit.) series of seventeen cases, and in the same number of cases noted in Simmons' (loc. cit.) paper the deaths were likewise two in number.

Undescended Testicle.—In Simmons' series, undescended testicle occurred in conjunction with the hernia in eighteen cases, or 10·1 per cent. Attempt was made to remedy the anomaly in but nine cases. The only good result obtained was in the single case in which the operation was carried out in the time of predilection for this procedure, namely, before puberty. Rodman and Bonney[7] strongly recommend that the organ be transplanted into the scrotum whenever possible. The method of Bevan is preferred. They also report a case in which the transplantation, done before puberty, was followed by proper development of the organ.

Simmons notes a case of retraction of the normally placed testis following operation. In this case the testis was drawn up against the external ring, where its presence is a source of constant annoyance.

Unusual Contents of the Hernial Sac.—Four cases of hernia of the vermiform appendix are reported by J. A. C. Macewen.[8] All the cases were males, and the hernias were of the right inguinal variety. In three cases the hernias certainly were present at or soon after birth, thus bearing out the contention of certain authors that this anomaly is of congenital origin. In the fourth case the history in regard to this point was indefinite, and at operation the appendix was found to be perforated by a pin from within its lumen. The symptoms were those of an inflamed hernia. Three other similar conditions of perforation of the appendix in this rare location by a pin are noted.

Inflammation and strangulation of the appendix in the hernial sac are considered by J. Thon.[9] The Heidelberg statistics show the appendix to have been present either alone or in conjunction with other portions of the intestinal tract in twenty-eight out of a total of 602, or 4·65 per cent. The appendix in a hernial sac is subject to the same varieties of inflammation as in its normal situation. In general the symptoms are of a less stormy character, and the inflam-

mation is likely, as Wassiljew states, to be confined to the sac by early inflammatory closure of the hernial opening.

Typical hernial appendicitis usually takes the following course: "A hernia hitherto unnoticed suddenly appears, but may be reduced with more or less difficulty and with some pain. After a short time the hernia reappears and reposition cannot be effected. Or a previously replaceable hernia becomes suddenly irreducible. Then the hernia generally increases greatly in volume and becomes painful, while the scrotum may become reddened and œdematous. Occasionally vomiting is associated; especially at the outset this seems typical, but may be lacking. Only in rare cases is obstruction of the bowel found. Usually flatus and fæces continue to pass. Fever may be absent or variable in degree. The inflammation may subside or go on to abscess formation." Eight illustrative cases are cited.

Strangulation of the appendix in the sac gives similar symptoms, and it may be difficult to decide whether strangulation or inflammation was the first manifestation. Four cases are narrated. Thon advises in such cases to lengthen the hernial incision sufficiently to allow of dealing with the appendix through it, rather than to make a separate abdominal incision and draw the appendix backwards through the canal. If necessary, Poupart's ligament may be divided and re-sutured.

In large sliding hernias of the sigmoid, Hotchkiss[10] describes a method by which this part of the bowel may be reduced within the abdominal cavity. The sigmoid may be found so closely adherent to the posterior wall of the sac as to make it impossible to reduce the bowel and close off the sac by the usual methods of suture. In this case, by grasping the adherent sigmoid and pulling it gently forward, it will be found that the peritoneum of the split hernial sac will become everted in such a manner as easily to form a new and elongated mesentery for the sigmoid, with its smooth peritoneal surface turned outward to form its free surface, and its outer or non-peritoneal surfaces falling in contact. Suturing the edges of the new mesentery together permits its elongation to an extent sufficient to allow of the perfect reduction of the sigmoid into the abdominal cavity.

Double-loop hernia (W Hernia) is illustrated by a case of J. A. C. Macewen.[11] Only one of the loops was strangulated. This loop apparently had just found its way into the sac, while the other was bound up in many dense adhesions, giving evidence of having been present in the sac for a long time.

Hernia of the Uterus in Men and Women is the curious title of a contribution by Bland-Sutton,[12] in which hermaphroditism and developmental anomalies of the genital tract which could lead to such a condition are discussed.

Organized bodies free in hernial sacs and in the peritoneal cavity are considered by Palazzo.[13] He reports a case of each condition, and collects eighteen cases which showed such bodies in the hernial sac, and thirty-one cases in which they had been found in the peritoneal cavity. The mode of origin of many of these could not be determined,

though in certain cases they seemed to be derived by separation of an epiploic appendage, a portion of omentum, a pedunculated lipoma, and in one case from a fibroma of the ovary. He attempted unsuccessfully to reproduce the condition experimentally by (1) Subcutaneous or intraperitoneal injection of extracts of the glands of internal secretion; (2) Inserting fresh fibrinous masses within the peritoneal cavity; and (3) Subcutaneous and intraperitoneal injection of cultures of the colon bacillus and the tubercle bacillus.

Umbilical Hernia.—The treatment of this condition by the method of Mayo has become one of the most satisfactory operations of surgery. Howard A. Kelly[14] describes and illustrates a slightly more radical plan of procedure which is recommended as useful especially in stout individuals, in whom tension upon the sutures is great owing to the accumulated fat in the abdomen. An incision is made from the right and left margins of the hernial opening all the way across and through the strong fibrous sheaths of the recti, which are then raised from the recti above and below for 2 or 3 cms. The hernia sac is then freed from the rest of the tissue. It is opened, and any adherent omentum present is removed. If the intestines are adherent, they are carefully dissected free, and replaced in the abdominal cavity. The peritoneum is next sewn together with catgut. He then hauls up and sews the free margin of the lower under the upper flap from side to side with four to six interrupted silk sutures, using, if needs be, catgut between them. If the transrectal incision is angled a little upwards and the overlapping of the recti is well done, there may be a little tension; there is always a greatly diminished tension in the overlapping at the ring itself. The free overhanging margin of the upper flap is now sewed by a continuous catgut suture to the fibrous tissues, and the supporting part of the operation is completed.

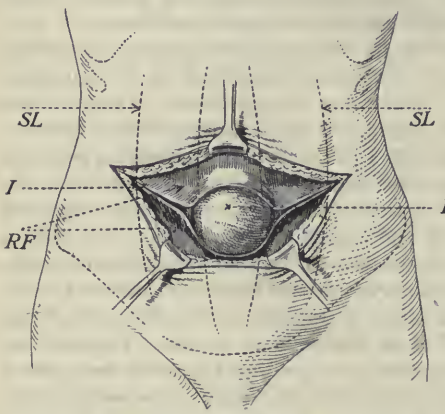

Fig. 25.—Umbilical hernia.—The diagram shows the patient lying in dorsal posture. A transverse incision (*I*) at the level of the umbilicus has been made from outside of one semilunar line across to outside of the other semilunar line (*SL*). The incision is made directly at the level of the umbilicus, and extends through fat and the sheath of the rectus (*RF*). The hernial sac (*H*) is seen protruding between recti muscles.

Richard Marck[15] reports a case of large congenital umbilical hernia into which practically all the abdominal organs were prolapsed. Eight hours after birth, operation was carried out, replacing the organs and repairing the abdominal wall with successful outcome. A total

of 112 similar cases treated by operation can be found in the literature, with eighty-eight recoveries and twenty-four deaths (21 per cent mortality).

Torsion and strangulation of the epiploic appendages in a hernial sac are treated by Kendirdjy and Sejournet[16] and G. Slaveiro.[17] Cases are cited to illustrate the fact that an epiploic appendage may

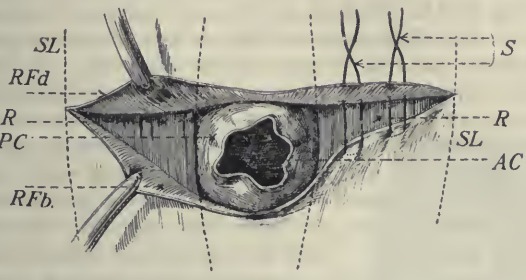

Fig. 26.—Umbilical hernia. Shows peritoneal cavity opening, sac removed, rectus sheath dissected free, and on one side silk sutures applied. (*SL*) Semilunar line; (*RFd*) Rectus fascia turned up (*RFb*) Rectus fascia turned down; (*R*) Rectus; (*PC*) Peritoneal cavity; (*AC*) Abdominal cavity; (*S*) Silk sutures.

be the sole content of a hernial sac. The symptoms of strangulation may be severe, and difficult or impossible to distinguish from early strangulation of the bowel. Usually, however, the symptoms are milder. It is unsafe to treat this condition, when suspected, by expectant methods, because of the uncertainty attending the diagnosis.

Internal Hernia.—A case of subcæcal hernia causing death, and discovered at autopsy, is described by A. C. Matthews.[18] About 6 in.

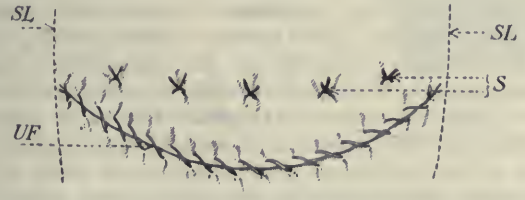

Fig. 27.—Umbilical hernia. Shows all the silk sutures (*S*) tied, and the lower edge of the upper flap (*UF*) sutured down to lower flap with catgut; (*SL*) Semilunar line.

of the ileum had made its way into the subcæcal fossa, where it had become strangulated at the narrow aperture. A résumé of seven cases of subcæcal hernia and of the same number of ileocæcal hernias is appended. The symptoms will be those of acute or subacute obstruction, and the diagnosis will usually be made only at operation.

REFERENCES.—[1]*Ann. Surg.* Sept. 1909; [2]*Inaug. Diss.* 1904; [3]*Deut. Zeits. f. Chir.* Bd. lvi; [4]*Bost. Med. & Surg. Jour.* June 23, 1910; [5]*Jour. R.A.M.C.* July, 1910; [6]*Münch. med. Woch.* Sept. 28, 1909; [7]*Amer. Jour. Med. Sci.* Feb. 1910; [8]*Ann. Surg.* Ap., 1909; [9]*Deut. med. Woch.* Jan. 27, 1910; [10]*Ann.*

Surg. Aug. 1909; [11]*Brit. Med. Jour.* Ap. 2, 1910; [12]*Ibid.* Oct. 30, 1909; [13]*Il Policl.* Oct. 1909; [14]*Ann. Surg.* May, 1910; [15]*Wien. klin. Woch.* June 9, 1910; [16]*Rev. de Chir.* July 10, 1910; [17]*Gaz. deg. Osped.* July 26, 1910; [18]*Ann. Surg.* May, 1910.

HERNIA. (Treatment by the Silver Filigree Method.)

Lawrie McGavin, F.R.C.S.

The tendency to recurrence exhibited by hernia at the umbilicus, ventral hernia, and inguinal hernia when of large size, or when occurring in patients in the middle period of life, is so well known that many of these cases have come to be regarded as incurable and inoperable by those who have pinned their faith to the older operative methods, and the sufferers have been compelled to wear various forms of belts and trusses for the rest of their lives. Such treatment is retrograde and unsound. Seeing that umbilical hernia, occurring as it usually does in excessively stout women, is capable of forming lateral sacculi in the deeper parts of the abdominal wall, it is impossible for any belt to prevent such formation; while in the case of inguinal hernia, the action of a truss invariably results in the matting together and thinning out of the subjacent tissues from constant pressure. In the first case the trouble is hidden, and the patient is lulled into a false sense of security; and in the second, the damage is so greatly increased that any ordinary form of operation is useless owing to the lack of sound material wherewith to reconstitute the inguinal canal.

The essential elements in the cure of any hernia are: (1) The complete removal of the sac or sacculi; and (2) The production of a perfectly unstretchable cicatrix. It is this latter rock on which surgical efforts have so frequently been wrecked. In 1904, however, it was proved by Willard Bartlett, of St. Louis, that it was possible to incorporate with the tissues fine networks of silver wire of large size, provided certain conditions were secured. These were: (1) Absolute asepsis; (2) Complete pliability of the apparatus used; and (3) Perfect anastomosis of the vessels through the meshes of the wire. He produced an apparatus termed "**Filigree**,"[1] formed of fine silver wire, which he used for the purpose of a scaffolding in dealing with large deficiencies of the abdominal wall. His results were so successful, and the method was so practical, that the present writer introduced the method into England, and applied it with certain modifications in the original pattern of the filigree, in his own practice. The method has now been in use in this country for six years, and has proved itself invaluable.

In the case of umbilical hernia, the filigree (fuller particulars of which will be found in the author's chapter on "Hernia," in Cassell's *System of Surgery*) may measure anything between 6·5 and 10 inches in length and 4 to 5 inches in width, this being the normal width of the combined sheaths of the rectus abdominis muscle in adults. As modified by the author it is barrel-shaped, and has three fine backbones of silver wire and 8 loops on either side to every inch of its length

(*Fig.* 28). Thus an 8-inch filigree will have 64 loops on either side. It is implanted as follows :—

The sac is isolated, and the abdomen being opened above it, the finger is introduced to explore for adhesions ; these are separated along one side, the incision running as closely as possible to the edge of the sac ; this is everted and evacuated, and the incision being completed along the other side, the sac and its coverings are removed together. The abdominal contents are now packed out of the way, and the contiguous edges of the rectus sheaths are opened in the whole length of the wound. The hand being slipped into the sheaths in front and then behind the muscles, these are separated from their attachments to the sheaths, the lineæ transversæ being snipped through with scissors if necessary, and the muscles are withdrawn from their sheaths towards the middle line. The abdomen is now closed, the edges of the peritoneum and posterior sheaths being picked up on the needle together. All bleeding is now arrested, and the wound is washed out with normal saline and thoroughly dried. By means of broad flat retractors the wound is held widely open, and the filigree, which should be lifted directly from the sterilizer into the wound, is laid upon the surface of the posterior rectus sheath so as to lie behind the muscles, which should be approximated over it as closely as possible. The filigree is not sutured in any way, but should come *well down to the symphysis pubis*. The muscles being united by four or five interrupted catgut sutures, the anterior layers of the sheaths are sutured, and the wound is closed in the usual manner.

Fig. 28.

Treated in this way the filigree rapidly becomes incorporated in the tissues, and a strong and perfectly unstretchable cicatrix is the result. So perfect is this that no belt or truss of any kind is required after the operation. No discomfort results from the wire, nor has any complication arisen from its presence. In the event of suppuration occurring, the wound after being opened at the lower end should not be probed, and *on no account should any attempt be made to remove the filigree* ; regular washing out with peroxide of hydrogen solution (8 to 10 vols.) will soon overcome the difficulty, and in every case the wound will ultimately close. The only effect in such cases is that the resulting cicatrix is even stronger than that produced by a primary union, owing to the excess of fibrous tissue produced. If the filigree is made of the

correct gauge (No. 28 standard wire gauge) and of the width advised, it cannot shift its position. *Plate XXVII, Fig. A*, shows a patient of the author's treated by this method with an eight-inch filigree. Her rupture, which was an unusually large one, was completely cured, the operation being conducted throughout under spinal analgesia.

These operations are difficult and often very tedious, and should only be undertaken by those who are conversant with major operations, and where a sufficiency of skilled assistance is available.

In cases of ventral hernia following appendicular abscesses, it is necessary to place the outer half of the filigree upon the peritoneum, which must be stripped outwards from the overlying muscles. The inner half is placed upon the posterior sheath of the rectus muscle above, and on the peritoneum below the semilunar fold. Thus the sheath must be opened in this case from the *outer margin*. The outer margin of the rectus muscle must then be joined to the cut edge of the oblique abdominal muscles over the filigree.

The Author's "Double-filigree Method" for Inguinal Hernia.—A similar difficulty in effecting a cure in the case of large inguinal herniæ, both direct and oblique, led the author to devise the following operation on the lines of Bartlett's method. (For a fuller account the reader is again referred to Messrs. Cassell's forthcoming work.)

Two small filigrees are constructed, much in the manner of Bartlett's filigree, a pubic section (*Fig.* 29), trapezoid in shape, measuring 1·5 inches in length, 1·5 inches in width at the wider end, and ·75 of an inch at the narrow or pubic end; and an iliac section (*Fig.* 30), the inner portion of which has the same shape and size as the outer half of the pubic section.

Fig. 29.

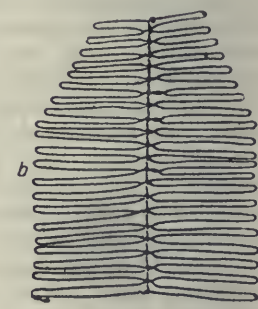

Fig. 30.

The *outer* portion of the iliac section may be of any size and shape suited to the requirements of the case. These sections have each a single midrib.

The sac having been tied off and removed, the pubic section is laid upon the peritoneum, with its narrow end in the pubic angle of the wound and deep to the conjoined tendon; its wide end is in contact with the inner margin of the internal abdominal ring. Over this section the conjoined tendon is united to the deep aspect of Poupart's ligament, as in an ordinary Bassini's closure. The spermatic cord is now laid upon the conjoined tendon, and the iliac section is placed so that its outer two-thirds lies on the internal oblique muscle, and its inner third on the commencement of the cord, which is thus "sandwiched," as it were, between the iliac section and the tendon. The

PLATE XXVII.

HERNIA: TREATMENT BY FILIGREE IMPLANTATION.

(Lawrie McGavin.)

Fig. A.

Fig. B.

Fig. C.

external oblique aponeurosis is then sutured to the cut margin above Poupart's ligament, as in the ordinary operation. Where the inguinal region external to the internal abdominal ring is very weak, the muscles here are divided outwards, and the iliac section is placed beneath them, the muscles being then sutured over the filigree ; this, however, is for exceptional cases. It is not necessary to fix the sections in any way, the pressure of the muscles holding them in position. The result of this operation is equally satisfactory ; the inguinal canal becomes firm and resistant ; no ill-effects are found to occur as regards the testis and cord, and the patient is quite unaware of the presence of the filigrees.

Should sepsis occur, the result may be different from that in the case of abdominal hernia. Owing to the small size of the filigrees, to the amount of movement taking place at the groin, and to the distention of the wound by pus, it is possible that the iliac section may shift its position upwards, in which case recurrence may be seen. In no case of the author's, so far as can be ascertained, has recurrence followed a primary union ; and in a long series of cases there have been only three of sepsis, and of these only one recurred ; this case was cured, after healing of the wound, by the implantation of a fresh iliac section. It is rarely possible to remove a filigree which has been implanted, but wires projecting into sinuses must be snipped out before the sinuses will close. The pubic section never shifts its position.

By this method it is possible to deal successfully with herniæ at any age and of almost any size. *Plate XXVII, Figs. B and C*, show cases of the author's[1] treated by this method. It is not employed by him as a routine method, but more especially in (1) All cases of recurrence ; (2) All herniæ in young people where the conditions happen to be unfavourable to the prospect of cure by Bassini's method alone ; (3) All large herniæ in patients over the age of forty.

N.B.—The gauge of wire given above should be rigidly adhered to for *all* herniæ, since wire of any lesser gauge is difficult to implant without disarrangement of the strands of the filigree.

Reference.—[1]*Ann. Surg.* 1904.

HODGKIN'S DISEASE AND LYMPHATIC LEUKÆMIA.

George Lovell Gulland, M.D.
Alexander Goodall, M.D.

Fraenkel and Much[1] have examined lymph glands from cases of Hodgkin's disease by means of the antiformin (a mixture of eau de Javelle and caustic soda) method. In nine out of ten cases they found a Gram-positive bacillus resembling the tubercle bacillus in morphology. Five cases of lymphæmia were studied, and in all of them there were similar organisms. The authors conclude that this organism or group of organisms has a definite etiological relationship to these diseases.

Reference.—[1]*Münch. med. Woch.* 1910, p. 685.

HYDATIDS OF LIVER. *Priestley Leech, M.D., F.R.C.S.*

Bollen[1] records two obstinate cases of sinuses left after operation on hydatids of the liver which had refused to heal under any treatment. He located both cases by the injection of bismuth subnitrate in white vaseline, at first 33 per cent strength and then 50 per cent. They both healed and remained healed.

REFERENCE.—[1]*Austral. Med. Gaz.* May 20, 1910.

HYDATIDS OF LUNG. *Joseph J. Perkins, M.B., F.R.C.P.*

Tuffier and Martin[1] call attention to the danger of exploratory puncture in cases of hydatid of the lung. Often immediate death has followed, and Pasquier places the mortality at 63·8 per cent, though this rate, the authors hold, is unduly high. The fatal symptoms are those of asphyxia, the result really of drowning in the fluid contents of the cyst, which is believed to contract vigorously under the stimulus of the puncture, rupture, and flood the cavity in the lung with its contents, whence they make their way up any bronchi that may lead into the cavity, and reach the general system of air-passages. If exploratory puncture is decided upon in a suspected case, everything should be in readiness for immediately cutting down upon the cavity and giving its contents free exit externally.

REFERENCE.—[1]*Rev. de Chir.* Jan. 10, 1910.

HYDRARTHROSIS, INTERMITTENT. *Robt. Hutchison, M.D.*

Garrod,[1] in an interesting study of this rare condition (of which only about seventy examples have been recorded), states that we are still as far as ever from a satisfactory explanation of the phenomenon. Those who have written on the subject agree in grouping the cases of intermittent hydrarthrosis into two classes, styled primary and symptomatic respectively. In primary cases, the periodic swelling comes on as an isolated event, sometimes after an injury, and the affected joints, which are in the great majority of instances the knees, recover completely or almost completely in the intervals, at any rate in the earlier stages. In symptomatic cases, on the other hand, the affected joints have already been damaged, more or less severely, by antecedent disease, such as the more obstinate forms of gonorrhœal arthritis, or the crippling lesions of many joints commonly classed as rheumatoid arthritis or arthritis deformans. In other respects, the cases of the two classes closely resemble each other, and the observation of a series of examples inclines one to the opinion that, as Linberger maintains, intermittent hydrarthrosis is a phase or symptom of various articular lesions, rather than a disease *sui generis*.

PATHOLOGY AND ETIOLOGY.—The view of the pathology of the affection which most commends itself is that which regards it as nearly akin to the acute circumscribed œdema of Quincke. The evidence which has been adduced in favour of the affinity of the periodic joint affection with circumscribed œdema is, at the least, highly suggestive. There have been met with in association with the hydrarthrosis, certain

troubles with which circumscribed œdema also is apt to be associated. Some of the patients have suffered from urticaria of the ordinary kind. Asthma has been met with as an associate; and other vasomotor disturbances, including polyuria coincident with the attacks, have also been observed. Several patients have suffered from exophthalmic goitre, and in a case of Homén's such a patient exhibited, sometimes patches of circumscribed œdema and at others intermittent swelling of joints. Further, circumscribed œdema and intermittent hydrarthrosis have been observed in the same individual in several instances, to which the writer adds another. The knee is the joint most frequently attacked, either alone or along with other articulations; and, indeed, only two instances are on record in which joints other than the knee were alone attacked.

Of concurrent conditions, pregnancy exercises the most conspicuous influence upon the course of intermittent hydrarthrosis. In almost every recorded instance in which pregnancy has intervened, the articular attacks have ceased during that period, but not always throughout the period.

The Prognosis of intermittent hydrarthrosis is on the whole unfavourable, although the attacks may cease spontaneously or as the result of treatment. In symptomatic cases the periodic swelling is an incident, the termination of which does not very conspicuously improve the patient's state, but in primary cases recovery means very much to the sufferer.

Treatment.—Various local measures have been tried, such as application of the **Actual Cautery; Incision and Drainage** of the affected joint; **Puncture and Washing-out** with solution of mercuric chloride or carbolic acid; **Injection of Iodine** into the synovial cavity; and each can lay claim to some success in monarticular cases. However, the improvement or arrest so obtained is not always permanent, and the attacks may resume, after an interval, in the same joint, or in one previously immune. If it be true that the affection is not a local one of the joints implicated, one would hope for better results from more general treatment. Rest in bed does not restrain the attacks, which recur with as much regularity as when the patient is up and about.

Linberger obtained some improvement from **Passive Hyperæmia,** by the application of Bier's method, and the plan might well be tried in other cases. Of drugs, **Arsenic** is by far the most useful, and appears to exert a conspicuous remedial effect in many cases.

Reference.—[1]*Quart. Jour. Med.* Jan. 1910.

HYDROCELE. *Priestley Leech, M.D., F.R.C.S.*

D'Alberto[1] records his experience with Mannino's method for the radical cure of hydrocele of the testicle. The secreting cavity is completely obliterated, the cure is radical, and recurrence impossible. The technique is as follows: An incision of 2½ inches is made in the scrotum; the tunica vaginalis is separated from the overlying tissues

of the scrotum ; the tunica is then incised, emptied of fluid, and the edges of the incision in the tunica are folded in on either side, and attached by a few points of sutures to the groove along the testicle where the parietal and visceral layers of the tunica meet.

Somerville Hastings[2] reports two cases of ruptured hydrocele, one spontaneous and the other accidental. It is not a very common accident, and its pathology is unknown, but is probably due to a diseased tunica vaginalis. The rupture is sometimes caused by movements, e.g., lifting, etc., or it may rupture while the patient is quite still, either sitting in a chair or even lying quietly in bed. Pain may accompany the rupture, or even this may be absent ; the patient notices that the swelling, in place of being tense, is flaccid, larger, and more diffuse. The affected side of the scrotum is œdematous, and later the œdema spreads slowly to the penis, especially the prepuce and the opposite side of the scrotum ; more or less discoloration of the scrotal tissues is to be seen within twelve to twenty-four hours of the rupture, and if a vessel of any size has been torn, a subserous or subcutaneous hæmatoma will be produced.

Treatment.—If antiseptic precautions can be taken, the best treatment in most cases is to cut down on the hydrocele, clear out all the blood-clot, etc., and perform a radical cure by removing the greater part of the parietal portion of the tunica vaginalis.

Reference.—[1]*Gaz. deg. Osped.* No. 53, May 3, 1910; [2]*Lancet*, Ap. 2, 1910.

HYDROPNEUMOTHORAX. *Joseph J. Perkins, M.B., F.R.C.P.*

Francine and Landis[1] have added an interesting case to the series of spontaneous pneumothorax arising in healthy people, and ending in complete, though it may be temporary, recovery. In this class of case, though there is no evidence of previous disease of the lung, and though complete absorption may occur, the after-history shows, from the development of pulmonary tuberculosis, that there must have been some latent tuberculous focus beneath the pleura, the softening of which gave rise to the pneumothorax.

This is not universally true, however, and in some cases of this class the complete freedom from tuberculosis in after years shows that there must have been some other lesion, perhaps the rupture of an emphysematous bleb. In the reported case there had been precedent anæmia and loss of weight, with a positive tuberculin test, so that it must probably be included in the group of latent tuberculosis. However this may eventuate, it is interesting to note that the pneumothorax, though succeeded by copious effusion, completely resolved, a final skiagram showing not only that the chest was free from fluid and air, but that the lungs themselves were free from any sign of disease, except some enlarged peribronchial glands.

Reference.—[1]*Med. Rec.* Nov. 20, 1909.

HYPERCHLORHYDRIA.

Aluminium Silicate in (*page* 5).

HYPERIDROSIS.

X-ray treatment of (*page* 78).

HYSTERIA.

Arsentriferrin in (*page* 18); **Medinal** (monosodium salt of veronal) in (*page* 39)) **Electricity** in (*page* 92).

IMBECILITY AND IDIOCY. *Bedford Pierce, M.D.*
Norah Kemp, M.B., C.M.

R. H. Dean[1] gives an interesting account of how he tested the blood-serum of the inmates of the Wilhelmslift, an asylum for idiots at Potsdam, by the Wassermann reaction. The cases were children or young adults, cases of simple idiocy or imbecility. His method was as follows: (1) All the cases were examined for evidence of congenital syphilis; (2) A blood sample was taken from the arm vein and tested by the Wassermann reaction; (3) Subsequently those which had given a positive reaction were again examined clinically. He says that "the serum test was carried out strictly in accordance with the original method, and watery extract of congenital syphilitic liver was used as antigen in all cases. . . . In the actual test, adequate controls from well-authenticated cases were invariably employed. No test was considered positive where more than the slightest trace of hæmolysis could be detected."

Out of 330 cases examined, 51 gave a positive reaction—15·4 per cent. Of these 51 cases, 7 had definite signs of syphilis, and in 3 or 4 others syphilis might have been suspected. Besides these, 2 cases had shown definite signs of syphilis, but the reaction had been negative. Amongst the positive cases, no symptom or group of symptoms was detected which was common to all. In twelve of these the cerebro-spinal fluid was examined, but only one gave a positive reaction. Specimens of the serum of the parents of some of the positive cases were examined, and it was found that 9 cases out of 13 gave a positive reaction. In 2 of these, fifteen or sixteen years had elapsed since the birth of the syphilitic child. He points out that in congenital syphilis the average age of the patients investigated is important in the estimation of the prevalence of congenital syphilis, and he found that the percentage of positive results diminishes rapidly after the sixteenth year in such cases. He refers to the value of the Wassermann reaction in the diagnosis of syphilis, and states that some believe that the serum test may from first to last be the only sign of a syphilitic infection. In view of the fact that 51 cases of idiocy and imbecility which he examined proved to be subjects of congenital syphilis or the children of syphilitic parents, he raises the question of causal relation between idiocy and syphilis. If such a relation exists, he thinks the resulting condition might be classed as parasyphilitic. His reason for such a classification is the fact that tabes and general paralysis frequently occur in patients in whom the early symptoms of syphilis have been mild or have escaped notice; he refers also to the juvenile cases of

general paralysis collected by Mott, in whom no sign of congenital syphilis was found, but who had been born of syphilitic parents, and who had brothers and sisters with the ordinary signs of the disease; therefore he thinks idiocy may be classed with that form of syphilis which only manifests itself by a selective toxic action on the elements of the central nervous system. He suggests, with a view to prophylactic treatment, that the blood-serum of any pregnant woman who is thought to be syphilitic should be tested, and if the reaction obtained is positive, active treatment of the mother might be followed later by treatment of the infant, so modifying or even averting the occurrence of symptoms. Professor Wassermann himself suggested that the blood-serum of every patient admitted into a lying-in hospital should be examined.

Charles E. Atwood[2] examined blood from 204 idiots; positive results were obtained in 30 of these, some of whom were 34, 35, and 37 years of age; in only four of these were signs of syphilis to be found.

In an interesting clinical lecture on feeble-minded children, A. F. Tredgold[3] speaks of the pathological conditions found in the brain of defectives. In idiots and imbeciles the whole brain is small as a rule, only occasionally being larger than normal; in all cases of marked mental defect, however, it was accompanied by some pathological condition which was apparent to the naked eye. But in cases of even the mildest degree of deficiency, microscopic changes were noted, such as defective development of the cortical neurones, most marked in certain regions of the brain. The amount of change revealed by the microscope is directly proportionate to the degree of deficiency revealed during life. In the brain of a normal person, a few undeveloped neuroblasts are often found, as though nature provided in excess of ordinary demands, and Tredgold suggests that these are the consequence of the inadequacy of our present educational methods. In the defective brain these undeveloped neuroblasts are much in excess of the healthy, fully-developed cells. The total number of cortical cells is smaller, and they are arranged irregularly, the cells lying either sideways or with their apices pointing upwards instead of downwards. Such cells may be found in all layers of the cortex, but especially in those of the medium and small pyramids, and they occur more frequently in the prefrontal and parietal lobes of the brain. Dr. Tredgold reminds us that these are the same layers and regions of the brain which are normally the latest to develop, and which show the earliest and greatest change in dementia, and he raises the question as to the cause of the failure of proliferation and development of these cells. Heredity and environment both influence the brain during its period of development, and he cites the cases of Kaspar Hauser and Laura Bridgeman as examples of cortical development being hindered by deprivation of stimuli; he believes that impressions of sight, sound, and taste are the most important factors of environment which encourage cortical development. When ill-nourished children are dwarfed in their minds, the condition is one of intellec-

tual dullness rather than mental enfeeblement, and disappears in an improved environment; therefore, in the case of feeble-minded children it is not the soil, but the seed which is at fault, the cortical cells failing to develop because the germinal plasm is defective, which inherent defect is due to morbid heredity; this may arise from one of these three conditions, viz., (1) Antecedent mental defect, insanity, epilepsy, etc.; (2) Tuberculosis; and (3) Alcoholism.

Shuttleworth,[4] in a paper on Mongolian imbecility, considers Mongolian imbeciles to be "exhaustion products," i.e., depending upon conditions adversely affecting the maternal reproductive power, such as advanced age in the mother and frequent child-bearing. Any depressing toxic influences in younger women might have the same result, such as neuropathic heredity, alcoholism, syphilis, tuberculosis. Pathologically the Mongol brain presents coarse convolutions and an absence of annectent gyri, the sulci being unusually shallow, and the cortex thinner. He quotes Bournville, who finds microscopically in such brains, marked rarefaction of the cells and thinning of the fibres of of the Exner net.

References.—[1]*Lancet*, July 23, 1910; [2]*Jour. Amer. Med. Assoc.* Aug. 6, 1910; [3]*Med. Press*, Aug. 25, 1909; [4]*Brit. Med. Jour.* Sept. 11, 1909.

IMPETIGO CONTAGIOSA.

(*Vol.* 1910, *p.* 550)—In some cases a polyvalent stock **Staphylococcal Vaccine** has done good. It is not necessary to control treatment by opsonic estimations.

INFANT FEEDING. *Prof. G. F. Still, M.D.*

The most important factor in the mortality of infancy is undoubtedly faulty feeding, and although progress in the dissemination of knowledge of the proper methods of feeding may be slow, it is evident that some reduction of infantile mortality has been, and can be still further, obtained by scientific study of this subject, and by application of the results in practice. As Holt[1] points out, the importance of infantile mortality has been increased by the steady decline of the birth-rate in European countries: during the last twenty-five years in eleven European countries the birth-rate has fallen from 33·7 per thousand of population to 30 per thousand, or about 10 per cent of births. The fall, he says, is least in Ireland, Norway, and Sweden, and greatest in England, Germany, Italy, Austria, and Hungary. An estimate from many writers shows that of every 1000 infants born, one-fifth die during the first year. Holt finds that the fundamental causes of infantile mortality are mainly three, viz., poverty, ignorance, and neglect: poverty acts not merely through bad housing and overcrowding, but also through the improper feeding so common where infants are deprived of breast-feeding owing to the necessity for their mothers to go out to work; ignorance of the simple facts of hygiene and feeding is a usual accompaniment of poverty. The contrast between the poor and the rich is very striking in respect of infantile mortality; it has been estimated that in England the mortality in the first year of life is 10 per cent amongst the aristocratic classes, amongst the middle classes 21 per

cent, and amongst the labouring classes 32 per cent. It is difficult to assign the mortality to its true cause always, but there is no doubt that improper feeding is the prime cause in a large proportion of the deaths ; acute diarrhœa may figure as the actual cause, but often this is only the terminal event following on a condition of disturbed digestion or marasmus due to faulty feeding ; similarly, convulsions, which, according to Holt, account for 3 to 4 per cent of the mortality during the first year of life, are very commonly related to faulty feeding.

Amongst the most important means of combating infantile mortality Holt places the encouragement of maternal nursing. In France there has been since 1876 a society for the promotion of breast-feeding ; and in England and Germany there are laws forbidding the employment of women in factories for a certain number of weeks after confinement. Wet-nursing, as a regular practice where maternal nursing is impossible, tends, according to Holt, to increase rather than reduce infant mortality, owing to the excessively high mortality of wet-nurses' infants. For artificial feeding a prime necessity is a pure milk supply, and in America much has been done to secure this by the establishment of Milk Commissions, which grant some certifying stamp for milk reaching certain standards of chemical and bacteriological excellence. Where such measures are not available, all milk should be heated, and Holt considers that in summer, if ice is not available, sterilization is to be preferred to pasteurization. He places first amongst the means of educating the poor in infant-feeding the distribution of milk through "milk depôts." In England these are worse than useless as a means of education, for the mothers who obtain milk from them for their infants have no idea what the mixture consists of, and consequently are likely to learn less of the proper methods of preparing milk for infant-feeding than the most careless of mothers who prepare a milk mixture at home.

Carter[2] emphasizes the value of weighing infants before and after a breast-feed, in order to ascertain how much milk is obtained from the breast ; in some cases it is found, in spite of the apparent contentment of the infant, that very little milk is being supplied by the mother, and the weight of the infant is not increasing satisfactorily on this account ; the addition of some artificial feeding may not only improve the weight, but so strengthen the child that its more vigorous sucking may stimulate the flow of milk in the breasts, when the artificial feeding can be discarded altogether. On the other hand, such weighings show that an infant will sometimes gain weight well upon quantities of breast milk—for instance only 3 oz. at a feed at six months' old—which in theory are quite inadequate.

By weighing before and after breast-feeds it may also be shown in some cases that where milk was supposed to have " dried up," and the infant in consequence was to be artificially fed, there is still plenty of milk being secreted.

Calories in Infant-feeding.—Feeding infants by the " caloric method " is one of those refinements of scientific detail which perhaps deserve

the name of pseudo-science. Chapin[3] gives a very practical and commonsense exposition of its value and its weakness. A calorie is the quantity of heat required to raise the temperature of one litre of water one degree centigrade. The caloric method assumes that because animals produce and give off heat, their food requirements can be determined by the quantity of heat they excrete. Fats, sugars, starches, meat, and other proteid foods all produce heat and are digestible, but mere heat-producing capability and digestibility are not sufficient: growth and tissue repair depend, not upon storage of heat, but upon assimilation of protein, etc. If the amount of food required were to be determined by the heat excreted, so that the value of the food was merely to produce calories equivalent to the heat excreted, there would be no storage from the food, in other words no growth; it is evident that the amount of food required cannot be estimated by the amount of heat excreted. The chief value of estimations of the caloric worth of foods is for comparison of foods in this respect; but as a guide to infant feeding they are of little use. Heubner states that during the first 3 months an infant requires 100 calories per kilo (about 2 lb.) of body weight; from 3 to 6 months, 90 calories per kilo of body weight; and from 6 to 12 months, 80 calories per kilo. Chapin gives a table from which the following are taken :—

	Water per cent	Protein per cent	Fat per cent	Carbohydrates per cent	Calories per oz.
Human Milk ..	87·0	2·0	4·0	7·0	22
Cow's Milk—					
Ordinary	87·0	3·0	3·0	5·0	18.3
Good	87·0	3·3	4.0	5·0	21
Jersey	86·5	3·5	5·5	5·0	26
Cream ..	74·0	2·5	18·5	4·5	62
Condensed Milk (sweetened)	26·9	8·8	8·3	54·1	95
Wheat Bread	35·0	9·1	1·6	53·3	70
Butter ..	11·0	1·0	85·0	—	22.5
Eggs (cooked)	65·0	11·7	10·7	—	42

Chapin says that the ordinary milk mixtures as calculated by the usual percentage-modification give caloric values quite near enough to those required by theory.

The difficulties of infant-feeding turn largely on the indigestibility of cow's milk compared with human milk; and although it has long been supposed that this depends chiefly upon the difference in the curd-forming proteid, there have recently been observations suggesting that some constituent of the whey may play an important part in determining the relative digestibility of milks. Findlay[4] mentions experiments by Meyer, in which the whey of human milk was mixed with the curd of cow's milk, and infants were found to thrive on this mixture, whereas when the whey of cow's milk was mixed with the curd of human milk,

the infants became ill. It seems possible that the great difference in the salts of human and cow's milk may account for some of this ; the inorganic salts are three and a half times more abundant in cow's milk than in human, and while salts of sodium, calcium, magnesium, and phosphorus are more plentiful, those of potassium and iron are less in cow's milk. But Findlay points out that if the salts obtained from human whey are added to the fat and casein of human milk, and the whole dissolved in distilled water, this mixture is not capable of nourishing infants properly, so that it seems likely that some organic substance may be the beneficial ingredient in milk ; Pfaundler has suggested that " complement " is this virtue-giving element. Findlay combats this view ; the complement found in the blood of infants seemed to vary with the age and the vigour of the infant, but not specially in relation to the feeding.

Milk-albumin. — Some observers have attached great importance to the lactalbumin of human milk as one of the chief points in which this milk is more valuable to infants than cow's milk. Beckel and Roeder[5] describe some experimental and clinical observations on albulactin, which purports to be a pure soluble form of milk albumin, in the form of an albuminous salt. It was found that whereas a simple mixture of cow's milk and water remained ninety minutes in the stomach, the same mixture with the addition of a small quantity of albulactin (about 7 gr. to a 3½-oz. feed) was retained only sixty-two minutes in the stomach before passing into the duodenum (human milk was retained fifty-six minutes). Moreover, it is stated that the addition of albulactin makes the curd formed from cow's milk less tough. Clinically, albulactin, given in doses of about 7 gr. in each feed to wasting infants, seemed to assist digestion and nutrition.

Starch has long been known to be a common cause of infantile digestive troubles ; Cautley[6] on the other hand holds that starch is not only allowable during early infancy, but is actually beneficial. There is much, he says, in favour of starch rather than cane-sugar in the feeding of infants. Even in the new born an amylolytic ferment is present in the pancreas, and the meconium and the stools of early infancy have a definite diastasic power. The nature of the starch is of importance ; starch is digested with difficulty, unless it has been previously converted by heat into " soluble starch," as in making barley-water. The mixing of hot water with starch grains causes the granulose to swell up and burst the cellulose envelope of the grains, which thus form a sticky mass of starch paste ; this on being boiled becomes thinner, forming " soluble starch," an intermediate stage in the conversion of starch into dextrines and sugar, which is completed by any diastasic ferment. Cereal decoctions, such as barley-water, are unsuitable media for the growth of proteolytic bacteria on which many cases of infantile diarrhœa depend, so that indirectly this starchy food acts as an intestinal antiseptic. Directly also it may, according to Cautley, be of value as an antiseptic, for it aids in the production of lactic acid, and for this reason either starch or sugar is an important

addition to the diet where buttermilk feeding or lactobacilline treatment is being used. Barley-water usually contains about 2 per cent of starch. During the first few weeks of life the proportion of starch in a milk mixture should not exceed ·5 per cent, and this should be gradually increased as the child grows older.

Top-milk has long been recommended as useful in overcoming the difficulty of securing a proper fat percentage in diluted milk; it is stated that if milk is allowed to stand eight hours, the top fourth contains 10 per cent and the top half 8 per cent of fat, and obviously if such milk be diluted, as it must be for infant feeding to reduce the casein, the inevitable reduction of the fat proportion will not result in a serious deficiency of fat as it usually does when ordinary milk is diluted. Hess,[7] however, points out that there is another feature of top-milk which has to be considered, namely, the bacterial content of top-milk as compared with the lower part; he finds that the bacteria are not uniformly distributed, but are present in far greater numbers in the upper than in the lower strata of the cream; in the upper 2 oz. of bottled milk there were found 115,000 bacteria per cc., in the next 2 oz. 36,000 bacteria per cc., and in the remainder only 6,000 bacteria per cc. Both tubercle and typhoid bacilli were found to be more numerous in the upper strata of the cream than in the lower. Hess recommends, therefore, that for infant feeding the uppermost layer of cream should be discarded, and that the next layer should be used.

Dried Milk.—The reduction of milk to powder by passing it in a thin film over revolving heated cylinders with a temperature of about 250° F. has now become an important commercial process. Millard[8] states that such milk has been in use about eighteen months at the Leicester Corporation Milk Depôt, and that amongst "some hundreds of infants fed on it for periods ranging up to ten months" or longer, no case of scurvy has so far occurred. Its advantages were found to be easy digestibility compared with any ordinary milk-mixture, freedom from tubercle bacilli and fly contamination, the absence of any tendency to turn sour in hot weather, its cheapness, its ready availability, and its palatable character, as shown by the readiness with which infants take it. It remains, however, to be proved whether it is liable to produce scurvy.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Feb. 26, 1910; [2]*Brit. Med. Jour.* June 25, 1910; [3]*Med. Rec.* May 28, 1910; [4]*Glasg. Med. Jour.* Feb. 1910; [5]*Med. Press*, May 4, 1910; [6]*Lancet*, Nov. 6, 1909; [7]*Jour. Amer. Med. Assoc.* Aug. 14, 1909; [8]*Brit. Med. Jour.* Jan. 29, 1910.

INFLUENZA.

(*Vol.* 1910, *p.* 390)—Bellamy recommends, for simple cases: Sodii Salicyl., Pot. Bicarb. āā gr. x, Liq. Ammon. Acet. ʒj, Ammon. Carb. gr. iij, Aq. Chlorof. ad ʒss, every four hours. **Phenazone** in gr. x doses may be given to relieve headache. **Salipyrin** gr. x–xv every four hours till symptoms subside is also recommended. The following draught should be taken with it: Spt. Ammon. Aromat. ℥xx, Spt. Ætheris Nitrosi, Glycerin āā ʒss, Ammon. Carb. gr. iij, Aq. Chlorof. ad ʒss. For cases with pulmonary complications, threatened pneumonia may be averted by the following treatment: Calomel with a saline purge, mustard and linseed poultices (1 to 6) applied to the bases of the lungs, with Tinct. Ferri Perchlor. ℥x, Liq. Ammon. Acet. ʒiss, Aq. Chlorof. ad ʒss, every three hours. Liq. Strychninæ may be added if necessary.

INSOMNIA.

Pituitary Ext. in (*page* 47).

INTESTINES, SURGERY OF.

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Intestinal Obstruction.—A number of miscellaneous cases of intestinal obstruction have been reported throughout the year, among which are instances of all the common modes of obstruction, and many of the uncommon varieties. The papers of Eisendrath[1] on "Ileus due to Meckel's Diverticulum," and Goodall[2] on "Chronic Primary Intussusception in the Adult," are especially systematic and thorough in dealing with their respective subjects.

The need for earlier diagnosis and treatment is unanimously emphasized. That in obstruction, as compared with appendicitis, we are far behind in these respects, is clear, and undoubtedly the cause of this is the greater difficulty in diagnosis of obstruction in the earlier stages. There can be no difference of opinion concerning the treatment when the state of affairs has been recognized. Still, it is true that the mortality is far greater than it should be even in the easiest of all obstruction cases to recognize, namely, strangulated hernia. The rapidity with which the accumulation of deadly toxic materials takes place in the gut above the obstructing point, and the danger that is thereby added to the simplest abdominal procedures, are not sufficiently appreciated. Usually the operation required to relieve the cause of obstruction is easy, and should *per se* be attended by the smallest mortality. It is the gangrene consequent upon delay, the peritonitis set up by migration of organisms through the damaged walls, the absorption of poisonous accumulations in the gut, and the necessity of performing extensive and less favourable operations on account of added pathology due solely to delay, that are responsible for the heavy and, at present, apparently undiminishing mortality. How is this undesirable state of affairs to be improved? While there are many sides to the question, it is certainly true that the present-day methods of teaching devote too little time to symptoms as an indication for treatment. In this respect we are suffering from the zeal with which the accurate study of disease has been carried on during the past century. While the gain has been enormous from the application of the exact methods of Louis to the formulation of accurate clinical pictures, it has come about that the majority of our text-books are essentially biologies of disease. As guides to diagnosis they are superb. As guides to therapeutics their deficiencies are glaring. The usual description of peritonitis, malignant disease, and obstruction of the bowels are cases in point. The characteristic features are beautifully delineated, but nowhere is it stated that to wait for classical symptoms is in a large percentage of cases to invite death and court disgrace. What we most need in placing our laborious pile of knowledge at the service of the world is a symptomatology which

brings out the early symptoms in bold relief, and emphasizes those threatening signs which justify or demand action. Thus, the symptomatology of intestinal obstruction could be well relieved of fæcal vomiting, which there is no doubt is the most prominent single symptom in the mind of the average general practitioner to-day as a result of the teaching. As Bevers[3] remarks, "a patient may vomit once at the time of onset of the obstruction, and then fail to do so again for twenty-four hours." When vomiting of the later stages makes its appearance, it indicates that there is already a large collection of poisonous material in the bowels, and that the prognosis is grave. Distention also develops slowly in many cases, and should not be awaited, though it may be of service if tested for by actual measurement, when it will become apparent at the onset before it is noticeable to grosser methods of examination. In the early stages the pulse commonly ranges within normal limits, and the temperature is usually but little affected.

A leucocytosis appears early, as shown by Bloodgood, and may serve to differentiate the attack from simple colic; but a blood-count is frequently impracticable, and its absence should not cause hesitation in the diagnosis. It is not too much to say that acute abdominal pain which causes vomiting unassociated with diarrhœa is, in nine cases out of ten, due to a condition best treated by immediate operation. Certain of the conditions which are so inaugurated become clear early in the majority of instances. Stone colics present well-known characteristics, and often a history of similar attacks. Inflammatory diseases, such as appendicitis, show early localization and rigidity of the abdominal wall, with early rise of pulse and temperature due to the quick absorption of bacterial toxins. Perforation of various viscera excites early peritonitis. Extra-uterine pregnancy has a distinct symptomatology. Acute obstruction, as a rule, remains non-committal longer than do any of these, and this lack of completely characteristic symptoms in the early stages should encourage us to make this diagnosis more often, rather than to wait for the terminating syndrome, which is typical both of obstruction and of approaching dissolution. Confirmatory points are not lacking, however. The presence of a hernia, the scar of an old abdominal operation, or the history of previous peritonitis, would cause us to think of strangulation or of bands of adhesions. If seen very early, stormy peristalsis and loud borborygmi attest the labouring of the gut in trying to force the barrier. The rising leucocytosis, above mentioned, and the slowness of the pulse and temperature reaction, with absence of signs of inflammation of the peritoneum, are helpful. Usually no passage can be secured from the bowels. The exception to this is found when the colon contains fæces, or when the obstruction is high up in the small intestine. In the latter instance the greater severity of the symptoms and their rapid march enable us to dispense with this sign. In certain types of obstruction special symptoms may be of considerable assistance, such as the demonstration of a tumour in obstruction by growth, the presence of a mass, and a

bloody diarrhœa in intussusception, etc. With all the diagnostic acumen available, however, it will frequently be impossible to do more than guess at the nature of an obstruction, and, after all, the improvement of our mortality from earlier operation rests upon the ability of the practitioner to size up his case as one which has suffered an intra-abdominal catastrophe necessitating operation. The man who will not act in such a case, preferring a great risk to his patient's life over a slight risk to his own reputation, is not worthy of the confidence reposed in him.

Another point to which attention should be given is the withholding of all nourishment, and especially cathartics, in case ileus is suspected. Usually these cases, in common with most other serious intra-abdominal conditions, have been belaboured with purges in the effort to induce the bowel to move. Such unwise efforts materially add to the danger and mortality.

Ileus due to Meckel's Diverticulum.—In connection with Meckel's diverticulum, persistence of the umbilical vessels must be considered. The varieties of persistent umbilical duct or vessels are thus classified by Eisendrath (loc. cit.): (1) A complete canal opening at the umbilicus at one end and into the ileum at the other—comparatively rare. (2) A canal opening at the umbilicus but ending blindly at a variable distance within the abdominal cavity. (3) An intermediate portion of the duct remains, having no communication externally at the umbilicus or internally into the gut, but forming a cystoma due to retention or secretion. Such a cystoma may have a ligament attaching it to the gut. (4) The tube is limited to the proximal end of the canal opening into the ileum. This is the variety generally known as Meckel's diverticulum, because Meckel in 1812 was the first to direct attention to its importance as the cause of various pathological conditions after birth. (5) The cord containing the umbilical vessels may persist as an independent structure and be attached to the umbilicus separately. This vascular cord may either take an independent course, or the vessels may run along the free border of the mesenteriolum of the diverticulum, or finally—and this is a very frequent condition—they may run from the tip of the diverticulum and form a cord, commonly known as the terminal ligament, whose points of attachment will be mentioned below. (6) The diverticulum may be either absent or very rudimentary, and the only evidence of the presence of a congenital condition be a cord (containing the umbilical vessels or traces of them) extending from the mesentery to the umbilicus.

The fibrous cord or band by which the diverticulum is attached either to the umbilicus or to some other structure is called the terminal ligament. This, as has been just explained, may represent the remains of the umbilical vessels which accompany the diverticulum. The normal point of fixation of the diverticulum or of its terminal ligament (which represents the obliterated portion of the diverticulum or its accompanying vessels) is at the umbilicus. The frequency of this attachment to the umbilicus varies somewhat according to different authors, e.g.,

Ketteler, 21 in 89 cases; Halstead, 15 in 69 cases; Treves, 7 in 20 cases; Cazin, 3 in 23 cases; and Newman, 13 in 66 cases.

If the terminal ligament separates from the umbilicus, it may attach itself at almost any portion of the abdominal cavity. The various

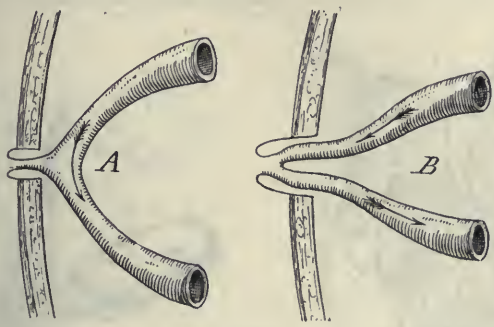

Fig. 31.—*A*, marked prolapse of open diverticulum at umbilicus without disturbance in passage of bowel contents. *B*, prolapse (evagination) of diverticulum causing ileus (Wilms).

points of attachment of the diverticulum or its terminal ligament are best shown in the accompanying figures of Ketteler, quoted from Wilms: Mesentery 34, umbilicus 21, anterior abdominal wall 6, posterior abdominal wall 4, pelvis 5, bladder 2, cæcum and appendix 2,

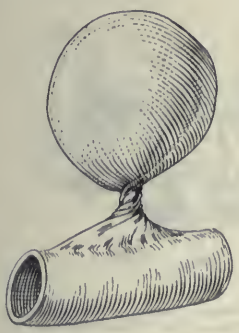

Fig. 32.—Volvulus of a diverticulum which has been converted into a retention cyst or enterocystoma (Roth's case).

Fig. 33.—Gangrene of diverticulum due to volvulus of diverticulum accompanied by volvulus of adjacent intestine (Elliott's case).

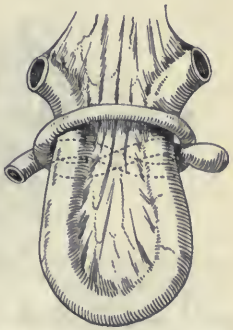

Fig. 34.—Knot formation by Meckel's diverticulum.

small intestine 11, large intestine 1, appendix epiploicæ of sigmoid 1, internal abdominal ring 1, intestine, omentum and abdominal wall combined—making a total of 89. Four cases are quoted by

Neumann in which a vascular cord alone was present without any diverticulum. One can prove such a cord to be of non-inflammatory origin by demonstrating the vessels within its structure.

In classifying the various types of this variety of ileus, Eisendrath adopts Wilms' classification, quoting him as follows: "A clinical

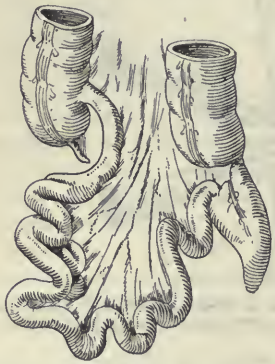

Fig. 35.—Stenosis of intestine at insertion of Meckel's diverticulum causing ileus (Good's case).

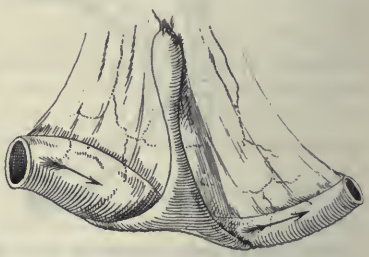

Fig. 36. — Ileus due to kinking of gut following traction of an adherent diverticulum (Hansemann's case).

classification would be far more practical than a pathological one, but it is almost impossible to make one upon such a basis." Varieties and illustrations which are self-explanatory are shown in *Figs.* 31–42.

A case is reported in which two loops of ileum had become strangulated beneath a ring formed by a diverticulum with a terminal ligament

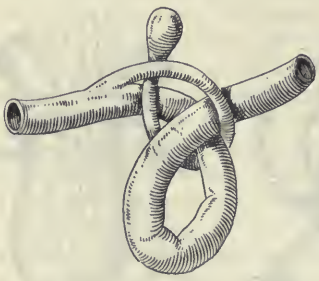

Fig. 37.—Ileus due to coil of intestine distal to insertion of diverticulum slipping into diverticular knot (Heiberg's case).

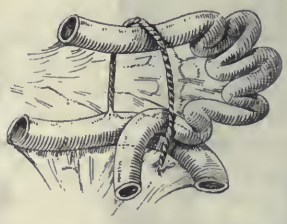

Fig. 38.—Narrow diverticular ring (Wilms) causing strangulation of gut. The diverticulum is almost completely obliterated, and the ring is chiefly formed by the vascular cord.

inserting into the neighbouring mesentery. Operation was done thirty-nine hours after onset, and consisted in release of the loops and excision of diverticulum and terminal ligament. Prompt recovery followed. Before operation the case was thought to be one of perforative peritonitis, this diagnosis being due to intense peritoneal irritation

from the gangrenous diverticulum. Unless one can obtain a history of an umbilical fistula which existed during infancy, but has healed, or unless an open diverticulum be still present, Eisendrath considers it impossible to make a diagnosis of a Meckel's diverticulum being the specific cause of the ileus in a given case.

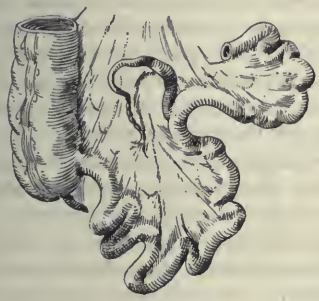

Fig. 39.—Wide diverticular ring (Wilms).

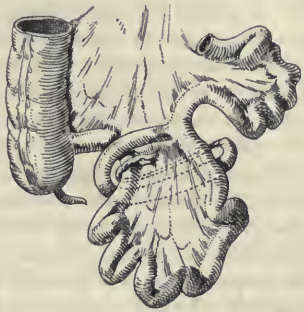

Fig. 40.—Strangulation in a narrow diverticular ring (Wilms). The ring was quite large at first, but as a result of the slipping of one coil below and one above the diverticulum, the wide ring becomes converted into two narrow ones.

The rare condition of volvulus of the cæcum and ascending colon is illustrated in a case reported by R. J. Pye-Smith.[4] The symptoms did not differ essentially from volvulus of the sigmoid, which was the diagnosis before operation. Death resulted from the anæsthesia, which was induced by chloroform, before the operation was commenced.

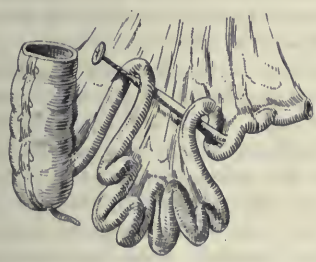

Fig. 41.—Ileus due to kinking of the intestine from traction across an adherent diverticulum (Wilms). Note how the afferent and efferent loops of the bowels hang across the diverticulum like a shawl carried upon the arm.

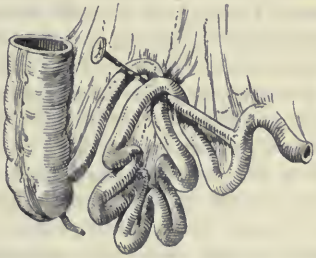

Fig. 42.—Ileus due (*a*) to kinking (the result of traction from a coil riding astride an adherent diverticulum) and (*b*) to volvulus of the obstructed loop (Wilms).

Chronic Primary Intussusception in the Adult.—Goodall (loc. cit.) reports five cases of chronic primary intussusception, varying in duration from three weeks to a year, and collects 117 cases from the literature. Four of his cases were ileocæcal, the remaining one being in the ileum. An invagination may become chronic in any part of the intestinal canal, as shown by the list. Ileocæcal, 78 (70·3 per cent); enteric,

17 (15·3 per cent); colic, 15 (13·5 per cent); Meckel's diverticulum, 1 (·9 per cent); not stated, 11.

An extensive analysis of the symptoms is given, in which it is seen that any of the ordinary symptoms of intussusception may be present in any degree. He states that "the diagnosis is difficult in all but the typical cases. In many instances a definite conclusion can be reached only after a period of observation. Recurrent attacks of abdominal colic, with symptoms of intestinal obstruction, the presence of an abdominal tumour which appears and disappears with the pain, or which is constantly present but changes its shape and position, or, in the absence of these two characteristics, corresponds in shape to the intestine, together with blood and mucus in the stools, are the typical picture. Rectal tumour, if present, is conclusive. The progressive anæmia and emaciation with the afebrile course complete the picture. Pathognomonic signs are the changing character of the abdominal tumour, the occurrence of rectal tumour, and blood and mucus in the stools. The presence of any one of these signs should immediately arouse suspicion. In the absence of tumour, an accurate diagnosis is impossible."

Spontaneous cure has been noted in not a few instances by passing of the sloughed segment, but operation is counselled. Seventeen of the 47 operative cases died, a mortality of 36·1 per cent. Of the 22 cases in which resection was done, 4 died, a mortality of 18·1 per cent. Of the 8 cases in which the bowel was disinvaginated, 2, or 25 per cent, died. Of the 17 cases in which palliative operations were performed, 11, or 64·7 per cent, died.

Congenital Intestinal Obstruction.—Seven cases of this condition are added by N. I. Spriggs.[5] The conditions found were: (1) Septum in ileum; (2) and (3) Atresia of ileum; (4) Atresia of ileum with loss of continuity of bowel; (5) Multiple atresia of the jejuno-ileum; (6) Atresia of duodenum; (7) Obstruction due to an abnormal condition of the mesentery, the lower portion of the ileum and all the colon being greatly narrowed and entirely retroperitoneal. Patient No. 6 died spontaneously at the end of three weeks. All the others were operated upon within the first few days after birth. All succumbed. As yet there is no case of recovery in the literature. The contracted state of the bowel below the point or points of stricture has so far rendered surgery difficult, and defeated resumption of function after anastomosis above or below. Clogg[6] has suggested dilating the lower segment by hydraulic pressure from below.

Paralytic Ileus.—Two cases of this interesting condition associated with fractured ribs are reported by J. E. Adams.[7] Both presented the picture of intestinal obstruction following immediately upon the accident causing fracture of the ribs. The first case was explored, and in the absence of demonstrable obstruction the abdomen was closed without other action. He rallied from the operation, the vomiting ceased, and a satisfactory movement of the bowels was obtained after forty-eight hours, but the patient died nevertheless. Autopsy

showed great distention of the small bowel and the cæcum, while the colon was collapsed. There was no organic obstruction.

In the second case, as the patient was old and in desperate condition, the expedient was tried of puncturing the bowel through the abdominal wall with a hollow needle. A quantity of gas and a little fæcal matter were ejected. The patient experienced a sense of great relief. After two doses of eserine salicylate gr. $\frac{1}{50}$ the bowels acted twice. The improvement lasted only sixteen hours, and at the end of that time the distention was as bad as before. This time an enterostomy was done under local anæsthesia and a small winged catheter inserted. The relief of the distention apparently restored peristalsis, in twenty-four hours evacuation per rectum began, and recovery ensued.

No explanation is forthcoming for this uncommon condition, though it is thought possible that irritation of the splanchnic sympathetic nerves may be responsible in accordance with the effects of stimulation of these nerves experimentally demonstrated by Bayliss and Starling, and thus summed up by the latter: "Stimulation of the splanchnic causes complete relaxation of the lower part of the ileum with the rest of the small bowel, but it produces a strong contraction of the muscle fibres forming the ileocolic sphincter."

The risk of blindly puncturing the bowel through the abdominal wall is recognized, though it gave no ill-effects in the case in which it was done.

From the outcome of this case Adams is convinced that ileostomy should be performed more often for the relief of paralytic distention of the bowel, whatever the primary cause of the condition may be, and whether peritonitis be present or not.

Carling[8] reports a case of stricture of the jejunum in an adult, thought to be of congenital origin. The symptoms were those of pyloric obstruction, and were entirely relieved by resection of the strictured gut. In the same paper he also recounts a case of traumatic rupture of the jejunum due to a kick by a horse, which recovered after suture of the perforation, and also a case of carcinoma of the jejunum in which recovery had been maintained for eight months, at the time the report was made, after resection. He states that there are only some seventy cases of carcinoma of the whole small intestine below the papilla available in the literature.

Large Intestine.—That the prognosis of carcinoma of the cæcum treated by resection is not absolutely gloomy is strengthened by the report of two cases by E. A. Smith.[9] The first case has been perfectly well for eight years, and the second after two years showed no sign of recurrence. Both of these growths were of the colloid variety, in which, as is well known, the degree of malignancy is lower. This should encourage resort to operation in every case, since it is manifestly impossible to determine the type of growth in advance of laparotomy. According to Sutton, in every 100 cases of intestinal cancer, 75 occur in the rectum, 23 in the large intestine, and 2 in the small. Of the 23 cancers of the large intestine, 2 occur in the cæcum,

3 in the hepatic flexure, 4 in the splenic flexure, 10 in the sigmoid flexure, and 4 elsewhere in the colon. The signs and symptoms of cæcal cancer, according to Smith, can be grouped under two headings : (1) Those of a low-grade septicæmia plus the toxæmia of intestinal putrefaction, and (2) Those of increasing mechanical interference with peristalsis—that is, obstruction of the bowel. The characteristic group of symptoms are loss of appetite, impaired digestion, loss of flesh and colour, and later constipation, increasing in obstinacy, accompanied by colicky pains, most severe in the lower right quadrant of the abdomen. The low-grade septicæmia gives rise to intermittent elevation of temperature, occasionally reaching 99·5° or 100° F. Pulse-rate rises as the disease progresses. In the majority of cases of cæcal cancer the tumour may be felt, which gives new significance to the symptoms just mentioned. In cases which present the signs of slowly increasing interference with peristalsis, the physician cannot be too alert. A brief review is appended of thirty-eight cases of cancer of the cæcum occurring since the papers of Cumston and Vanderveer,[10] in 1902, in which eighty-one cases were collected.

John H. Gibbon[11] also details eight cases of cancer of the colon and two of tuberculosis in which resection was done. This communication possesses considerable practical value, as the author does not hesitate to call attention to those features of the operations which experience showed to be mistakes. The following questions are discussed : (1) Where should incision be made in operating for diseases of the colon ? (2) Is one justified in doing a resection and an anastomosis in the presence of acute obstruction, or should the obstruction first be relieved by drainage ? (3) What are the relative merits of end-to-end and lateral anastomosis ? (4) What is the best method of making the anastomosis ? (5) Should drainage be used if the peritoneum is not already infected ? (6) To what is the operative mortality due ? (7) Is ultimate mortality due to too limited excision of the bowel ? The type of incision is regarded as unimportant, the essential point being free access to the affected portion of the bowel.

In regard to resection and anastomosis in the presence of obstruction, all surgeons have agreed that however easy the operation seems, it should never be done. Gibbon reached this conclusion after sad experiences, and quotes with approval Moynihan's words that " there are few rules so binding upon the surgeon as that which prohibits the resection of growths and subsequent end-to-end anastomosis of the large intestine in cases of acute obstruction." Primary colostomy is essential in such cases.

End-to-end anastomosis is only to be employed in case the peritoneal coat may be brought in from the two lateral aspects and made to cover the divided mesenteric attachment. This can be done only when the entire bowel is covered with peritoneum. In all other cases a lateral anastomosis is superior. End-to-side union is more difficult and less satisfactory.

Anastomosis should be performed by suture, never by any mechanical

device. Murphy himself has been emphatic upon this point. In the *Year Book of Surgery*, 1908, he states that for years he has advised against the use of the button in large intestine anastomosis, except possibly in lateral anastomosis high up in the colon, and in these cases the oblong button should be used. Drainage should be employed in any case which presents any doubt as to the perfection of the anastomosis or a healthy condition of the bowel.

In answer to the question, To what is the operative mortality due? Gibbon finds that the immediate operative mortality is remarkably small, and that the late operative mortality is large. In the ten cases there were five operative deaths. One case died eight hours after operation. He had a marked endocarditis and a large aneurysm of the aorta. Death was attributed to the cardiac condition, though peritonitis was present and might have caused death later. The other four died much later—one on the twenty-third day from infection due to necrosis of the bowel with fæcal leakage, one on the sixth day from septic intoxication, one on the twenty-fifth day from a low-grade infection and fæcal fistula, and one on the fourteenth day from the same causes. This again speaks for primary drainage to obviate local trouble with the anastomosis. The amount of bowel removed according to present surgical practice is regarded as sufficient, since local recurrence is rare. Two cancer patients are well four years two months, and fourteen months respectively after operation: one case of tuberculosis of the cæcum is well four months after.

Two cases of tuberculosis of the colon treated by operation are reported by E. W. Hey Groves.[12] One was of the ulcerative or entero-peritoneal type of Hartmann, and came to operation because of perforation of the cæcum. This case recovered after a stormy convalescence. The remaining case was of the hyperplastic variety, and after three ineffectual operations succumbed to the disease.

W. J. Mayo[13] describes with characteristic clearness his method of procedure in the removal of growths of the sigmoid. He also counsels against resection of an obstructed large intestine. In moderate chronic obstruction, however, he may, if conditions are favourable, empty the intestine by means of Monk's tube and then resect and anastomose. If this is done it is best to fasten the site of the resection and leave it exposed in the wound after the Bloodgood method (*Fig.* 43).

"Tumours of the distal end of the sigmoid are most difficult to remove. If possible an end-to-end anastomosis is made with the rectum, but as the rectal end is devoid of peritoneum, union is unreliable. It may, however, be aided by passing a ¾-in. rubber tube with a lateral opening through the anus and rectum to a point 3 in. above the cut end and fastening it in this position by a lateral catgut suture. An assistant draws on the end of tube projecting from the anus until the cut ends meet. Interrupted catgut sutures unite end to end, the operator taking pains to coapt the mucous membranes accurately. The rectal tube is then again pulled upon until a ½-in.

intussusception is produced, and a second seromuscular row of sutures is inserted. The tube is left in position for four to six days, coming away after the catgut has been absorbed.

"Occasionally a combined abdomino-perineal will be the best method."

Mayo states that at the present time the immediate mortality is

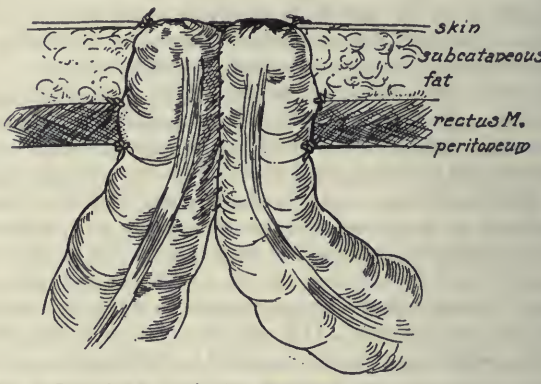

Fig. 43.—Lateral anastomosis after the Bloodgood method.

from 3 to 10 per cent, depending on the condition of the patient, and that half of these cases may expect to remain cured.

No consideration of diseases of the colon is complete nowadays without mention of *diverticulitis*. Taylor and Lakin[14] report three cases of perforative peritonitis originating in pouches of the large intestine. This is a condition to be reckoned with, especially in the

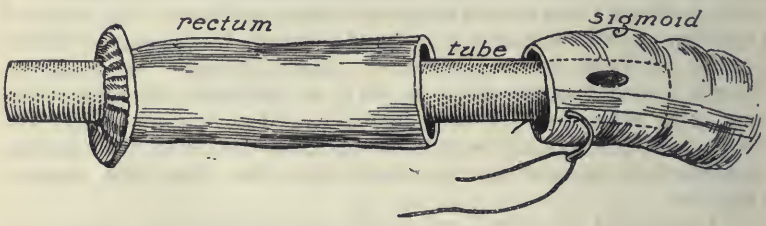

Fig. 44.—Showing rubber tube passed through rectum into upper portion of sigmoid and fastened in place by catgut sutures.

peritonitides of late adult life. The cases reported were aged fifty-seven, sixty-five, and seventy years respectively. Two other cases are noted from the post-mortem room of the Middlesex Hospital, in which numerous diverticula were found which had given no trouble during life. The ages in these cases were sixty-eight and sixty-nine years. The pouches are generally multiple, and increase in number and frequency from above downwards. An uncommon condition is

recorded in one of the autopsied cases, in which diverticula were found in the upper part of the jejunum. The diverticula form usually at points of least resistance, common sites being at the mesenteric border, where the muscular coats are deficient to allow passage of the vessels, or, as Bland-Sutton has pointed out, opposite the appendices epiploicæ, where the soft fatty tissue of the appendages is continuous with the subserous fat. In accordance with the usual sites of predilection, diverticulitis usually gives localizing signs on the left side. In one of the cases this led to serious error. Upon arrival at the hospital there were evidences of diffuse peritonitis, which was regarded as probably of appendiceal origin. At operation the appendix was found to share only in the general inflammation. The descending colon was examined for stercoral ulcer, and numerous diverticula were found, but no perforation. At autopsy a perforated diverticulum was discovered about $5\frac{1}{2}$ in. above the cæcum. A second case died before operation could be performed, but the third recovered after the removal of a perforated concretion-containing diverticulum of the sigmoid.

Appendicostomy, Cæcostomy, and Colostomy are the subjects of articles by Waller[15 16] and Reed.[17] These authors warmly recommend such operations for obstinate cases of colitis, dysentery, and chronic constipation.

Mamourian[18] suggests, in cases of intestinal obstruction, a method of drainage of over-distended bowel which appears to possess certain advantages over simple incision. A Murphy button and a piece of soft rubber tubing are utilized. "A purse-string suture of silk is passed round one of the ends of the rubber tube, the male or female half of the button is introduced into the lumen, and the thread tightened so as to grip the neck of the button. Next, a segment of the distended bowel is clamped and a linear purse-string suture inserted. The gut is incised, the other half of the button placed in position, and finally the two sections of the instrument are united in the usual way. The anastomosis between bowel and rubber tube is complete, and on removing the clamp there is no leakage, and the fæcal contents pass out of the tube into a jar containing some kind of deodorant well away from the area of operation."

The amount of mesentery which can safely be stripped from the colon without resulting gangrene of the bowel is considered by F. E. Bunts.[19] During an operation for umbilical hernia, while freeing the dense adhesions, the descending colon was unintentionally denuded of its mesentery for a distance of 8 in. As the patient was standing operation badly, it was decided simply to suture the mesentery again to the bowel. The patient recovered without symptoms referable to disturbance of the circulation of the bowel. In order to determine the degree of viability of the colon when deprived of its mesentery in varying lengths, and also to ascertain whether the device of re-suturing the divided mesentery is of any material assistance in nourishing the segment affected, a number of experiments were carried out upon dogs. Of five cases of separation of the mesentery for

distances varying from 3 to 12 in., followed by suture, injury of the colic artery being avoided, four survived. The dog in which 12 in. was separated, died of gangrene of that portion. In two cases similarly treated, except that the colic artery was ligatured, death followed. Three dogs in which the mesentery was separated for distances varying from 4 to 8 in. without resuture of the mesentery, all perished. From these experiments Bunts concludes that the slight amount of nourishment derived from the mesentery after resuture aids materially in maintaining the life of the gut.

End-to-end anastomosis by the invagination method has been employed by C. L. Gibson[20] in four cases. In the first two cases, owing to operative difficulties, this seemed to be the only way to unite the rectum and sigmoid. As these patients recovered, the operation was deliberately done in two other cases, one of whom recovered, and in the other death could not be attributed to the anastomosis. The operation was then extended to the small intestine in experiments upon dogs, and found to work well, but, as the author states, its chief field of usefulness is undoubtedly in the colon. The simplicity of the method is shown by the illustrations (*Plate XXVIII*). It is stated that narrowing of the canal was not produced in experimental cases, but if the operation were done upon the large intestine a slight degree of stenosis would be negligible. Since the paper was written, the method has been employed in two cases of gangrenous femoral hernia. One recovered fully, but the other died, peritonitis developing on the fifth day.

REFERENCES.—[1]*Ann. Surg.* Dec. 1909; [2]*Bost. Med. and Surg. Jour.* Ap. 7, 1910; [3]*Pract.* June, 1910; [4]*Lancet*, July 20, 1910; [5]*Ibid.* Jan. 8, 1910; [6]*Ibid.* Dec. 24, 1904; [7]*Ann. Surg.* Jan. 1910; [8]*Brit. Med. Jour.* Feb. 19, 1910; [9]*Ann. Surg.* Sept. 1909; [10]*Ibid.* Jan. 1902; [11]*Ibid.* Sept. 1909; [12]*Brist. Med.-Chir. Jour.* Sept. 1909; [13]*Montr. Med. Jour.* Oct. 1909; [14]*Lancet*, Feb. 19, 1910; [15]*Brit. Med. Jour.* Oct. 30, 1909; [16]*Clin. Jour.* Sept. 15, 1909; [17]*Jour. Amer. Med. Assoc.* Mar. 5, 1910; [18]*Brit. Med. Jour.* Nov. 20, 1909; [19]*Ann. Surg.* June, 1910; [20]*Ibid.* July, 1910.

IODODERMA BULLOSUM HÆMORRHAGICUM.

E. Graham Little, M.D., F.R.C.P.

This form of iodide rash is rare, usually associated with renal or cardiac disease, and, when it occurs, of very bad prognosis: death followed in the four cases which Gottheil[1] narrates three from the literature and one from his own experience. In one case a patient with chronic nephritis was ordered 15 gr. daily of sod. iodide; within ten days the eruption appeared, and the patient died. In Gottheil's case the eruption appeared within twenty-four hours of administration of iodides, and the patient died within four weeks. Gottheil advises careful watch of the action of the kidneys in patients taking iodides, which he regards as renal irritants. The eruption whose appearance is of such grave import takes the form of hæmorrhagic vesicles, usually on the face, hands, and forearms: puncture evacuates a non-coagulating sanguinolent fluid, in which red and white cells can be seen microscopically.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Oct. 30, 1909.

PLATE XXVIII.

INTESTINAL ANASTOMOSIS BY INVAGINATION.

(C. L. GIBSON'S METHOD.)

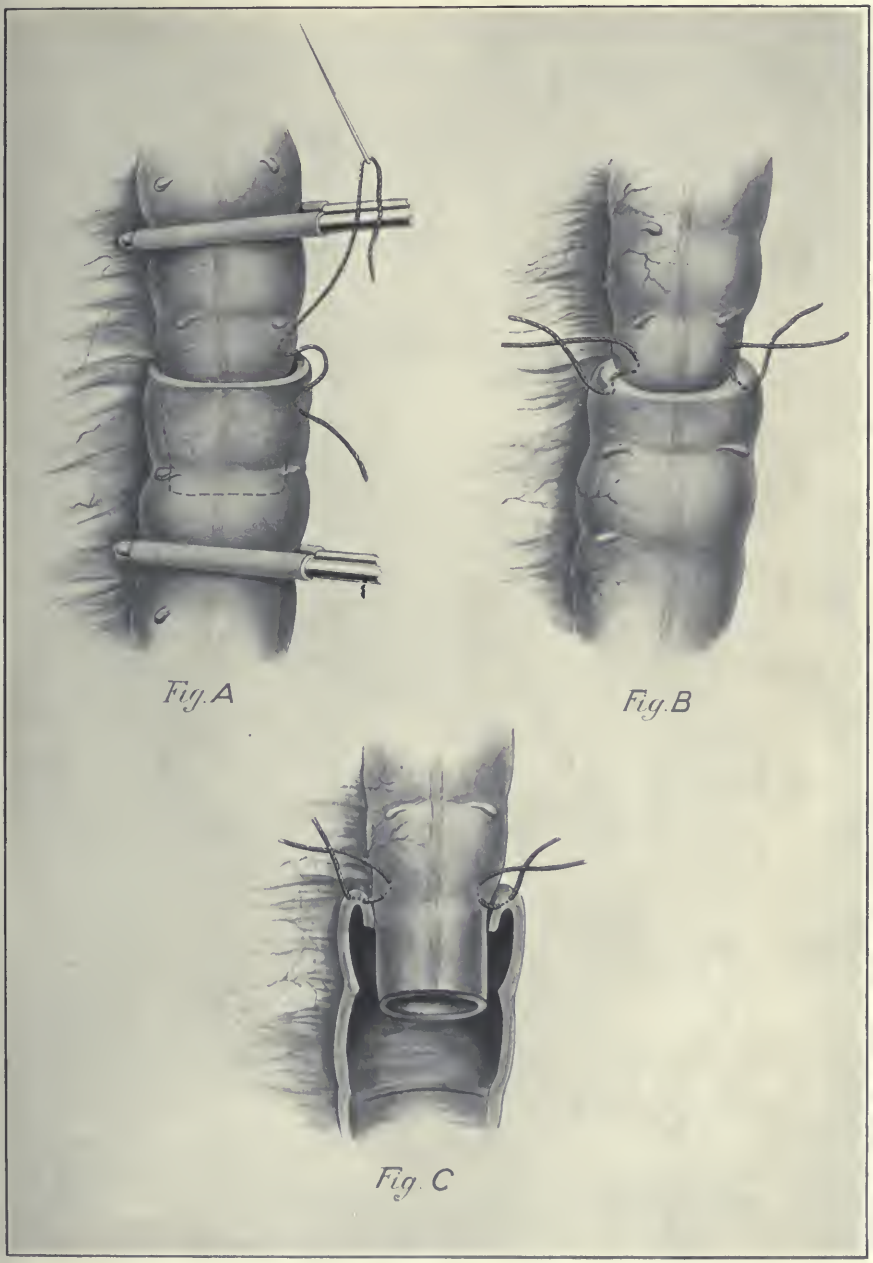

Fig. A.—Shows upper segment telescoped into lower. First suture introduced. *Fig. B.*—Invagination of edge of lower segment, bringing the two peritoneal surfaces into contact. *Fig. C.*—Interior view of the invagination.

IRITIS. *A. Hugh Thompson, M.D.*

There is a considerable difference of opinion on the etiology of this disease. All are agreed that the most common cause is syphilis, though the percentage of cases that are due to it is variously computed between 30 per cent by Worth,[1] and 70 per cent by Kenneth Campbell.[2] In an analysis by Jennings and Hill,[3] out of 307 syphilitic cases, both eyes were involved in 81, one eye in 226. Thirty-four presented syphilitic nodules on the iris, generally called gummata, but probably rather secondary than tertiary lesions. In only 46 cases, or 19·4 per cent, had there been previous attacks, which shows the comparative infrequency of recurrences in syphilitic as compared with rheumatic and gonorrhœal iritis. Rheumatism as a cause of iritis is put second by Jennings and Hill, who attribute 25 per cent of the recorded cases to it. Campbell, on the other hand, disbelieves in rheumatic fever as a cause of iritis, and implies that the word rheumatism used in any other connection has no definite meaning. Worth and Harrison Butler attribute more than half of their cases to septic intoxication from constipation, putrefactive processes in the bowel, decayed teeth, suppuration in connection with dead bone, etc. Since, however, few patients, whether they have iritis or not, are altogether free from one or other of these conditions, it is difficult to prove the causal connection. Moreover, the cases which are undoubtedly due to septic absorption are, as a rule, not cases of acute iritis simply, but of more or less chronic cyclitis with deposit on the posterior surface of the cornea, accompanied by iritis. Gonorrhœa accounted for 5·2 per cent of Jennings's cases. Many of the cases called rheumatic are probably due to this cause. Tubercle is one of the rarer causes of iritis. Other causes are said to be influenza, malaria, gout, etc.

Whatever the cause, the sovereign remedy is **Atropine.** Often it is not used sufficiently energetically, so that synechiæ are allowed to become permanent which might have been broken down. Oppenheimer[4] well says that a patient with an attack of iritis who consults us early ought never to be sent away from the doctor's consulting-room until the pupil is round and well dilated. For this purpose **Cocaine** is a useful adjunct to atropine. A 1 per cent solution of atropine with cocaine should be instilled every ten minutes for an hour or more until the synechiæ give way. A drop of **Adrenalin** at the commencement is also helpful in giving the atropine a better chance to act. The writer usually employs an ointment with 2 per cent each of atropine and cocaine, which is far less likely to find its way down the nasal duct and cause toxic symptoms than the drops. For home use the atropine and cocaine should be prescribed at stated intervals of two or three hours night and day, so long as there is a chance of breaking down synechiæ. When once the pupil is well dilated, a weaker ointment of atropine every six hours will be sufficient. Toxic symptoms must be watched for, especially in children, but a feeling of dryness in the mouth need not deter us from persevering. An irregular pulse, redness

of the face, and restlessness, especially in children, are surer warnings that the drug is exerting toxic effects.

References.—[1]*Brit. Med. Jour.* Aug. 13, 1910; [2]*Ibid.* Aug. 6, 1910; [3]*Ophthalm.* Oct. 1909, in *Edin. Med. Jour.* Mar. 1910; [4]*Deut. med. Woch.* Mar. 24, 1910.

KALA-AZAR. (*See* Leishmaniasis.)

KELOID.

Radium in (*page* 83).

KIDNEY, SURGERY OF. *E. Hurry Fenwick, F.R.C.S.*

Rupture.—It very occasionally happens that a practitioner is called upon to treat a case of rupture of the kidney of so serious a nature as to call for operative interference. Johnson,[1] who has added to the literature of the subject, gives the present position of surgery in cases which raise the question of operative interference, as follows:—

Only the more severe subcutaneous injuries of the kidney demand immediate operation, the indications being the rapid development of the general symptoms of hæmorrhage, namely, acute progressive anæmia, or the formation of a tumour mass surrounding the kidney combined with such symptoms, or alarming hæmorrhage through the ureters and bladder. A good many of the cases where the kidney substance is contused but the capsule is not ruptured, and where the contusion does not extend into the renal pelvis, are attended by only a moderate amount of hæmaturia, which gradually subsides, and is followed by a return to health. In other cases, where a considerable artery is torn and an arterial hæmatoma is formed in the kidney, repeated hæmorrhages of a severe grade ensue, and these constitute a positive indication for operation. In those cases where the capsule of the organ is torn, and where blood and urine are extravasated into the surrounding tissues, in the absence of indications for immediate operation on account of hæmorrhage, there will develop, in the course of days or weeks, septic symptoms, which are accompanied by characteristic signs; the formation of a boggy, tender tumour in the loin, profound prostration, etc., and in these the operative indications will become quite plain. In the cases attended by severe degrees of shock, or accompanied by injury of other important organs, the operative indications must be gathered from the general condition. The surgeon will seek to differentiate the symptoms of shock and hæmorrhage. If the former are gradually recovered from in the course of hours, the surgeon may safely wait, unless the amount of bleeding from the kidney is alarming, or unless the symptoms of internal hæmorrhage are manifest. Those ruptures of the kidney, accompanied by laceration of the peritoneum and extravasation of blood into the peritoneal cavity, will be attended by the symptoms of peritoneal irritation, and, if not operated upon, by peritonitis. The general signs and symptoms of severe abdominal injury, the history of the accident, the presence of severe abdominal pain, and rigidity of

the abdominal wall, will furnish indications for immediate operation, as in other injuries of the abdomen.

Tuberculosis.—In the course of an article on tuberculosis of the kidney, Morton,[2] of New York, makes the following remarks upon the diagnosis, which sum up the present attitude of urologists towards the disease:—

"The greatest aid to diagnosis is effected by cystoscopy and catheterization of the ureters. In the early stages the bladder is not much affected, and catheterization of the ureters is not difficult for the surgeon who has familiarized himself with the technique of this operation. In the later stages, after the bladder has become involved in the tuberculous process, catheterization is always difficult, and sometimes impossible. The bladder is contracted, containing only two or three ounces of fluid; and the ulcers bleed freely, completely obscuring the view.

"It has always been supposed that ulcerations seen with the cystoscope around the mouth of one ureter denoted an affection of the kidney on the same side; but Rovsing[3] has tabulated one hundred cases of tuberculous kidney, and contends that there is no uniformity about the localization of the ulceration, the ulcers being often located around the healthy ureter, or about both ureters, even though one kidney may be healthy. [This statement needs qualifying.—E. H. F.]

"The use of the Luys segregator is not advised in cases where it is impossible to catheterize both ureters; for unless the bladder is free from ulceration, the findings will be misleading, as the urine from kidneys will be contaminated by the pus formed in the ulceration of the bladder.

"In the cases which are difficult to examine, the diagnosis has to be worked out step by step. If we can only succeed in getting the urine from one kidney, we should endeavour to do so, to determine if the kidney on the side catheterized is healthy or diseased. A view of the ulceration around one or both ureters, together with a decided reaction following the injection of tuberculin, would be sufficient evidence of disease, provided the urine drawn from the bladder showed pus. The presence of tubercle bacilli would be confirmative, but not essential, for the diagnosis. In the cases where the diagnosis offers no special difficulty, after the ureters have been catheterized, the right and left urines should be examined. The presence of blood in the urine drawn does not necessarily imply disease on that side, as slight bleeding generally occurs from the traumatism of passing the catheter. The presence of pus in the urine denotes disease of that kidney. A comparison of the urea secreted would show the relative functional capacity of the two kidneys. If the urine from one side shows 10 gr. of urea with no pus and no albumin, and the urine from the other side shows 2 gr. of urea with more or less pus and albumin, it is evident that one kidney is healthy and the other diseased. The presence of sugar after the injection of phloridzin also shows the secreting capacity of the kidney. After the injection of $\frac{1}{10}$ gr. of phloridzin, sugar appears

in the urine from fifteen to thirty minutes later. The healthy kidney secretes about 1 per cent of sugar; the secretion from the diseased kidney is less, depending upon the extent of the disease. Cryoscopy of the right and left urines is very troublesome to carry out, and does not throw any more light on the secreting capacity of the kidney than the tests of urea and phloridzin. The cryoscopy of the blood in comparison with the urine is useless, on account of the number of conditions which change or modify the relative freezing-points of each.

"Rovsing found that in one-third of his cases where the bladder was involved, the ureters could not be catheterized. The writer has been successful in catheterizing the ureters occasionally in difficult cases with the patient under a general anæsthetic, where, on account of irritability of the bladder, it was impossible for it to retain enough fluid.

"The hypodermic injection of 1 dr. of a 4 per cent solution of indigo carmine, fifteen minutes before catheterizing, is sometimes helpful in finding the ureters. The indigo carmine stains the urine, and jets of coloured urine are seen issuing from the mouths of the ureters, which may then be more easily located. The indigo-carmine test is also useful as showing the secreting capacity of the kidney. In a healthy kidney the urine becomes tinged with blue in five minutes, and the excretion reaches its highest point from thirty to forty-five minutes after the injection. A delay in the commencement of the elimination, and a diminution in the quantity of dye eliminated, are indications of a reduced renal function.

"The most reliable of all the diagnostic tests are the animal inoculations. Guinea-pigs are inoculated by injecting into the peritoneal cavity a specimen of the urine drawn from the right and left kidney, and the mixed bladder urine. After three weeks the guinea-pigs are autopsied, and the presence or absence of tuberculous infection of the animal is proof positive of the condition in the human being.

"The prognosis in tuberculosis of the kidney, if treated expectantly is bad. Pathologists continually discover old scars of tuberculosis in the lungs, but old tuberculous lesions of the kidney are never discovered post mortem (*sic*). If the case is left without operation, the kidney condition grows progressively worse, ending in its complete disorganization, together with involvement of the other. The only treatment which should be considered in primary tuberculosis of one kidney is an early operation for its complete removal before the other one has become involved.

"The great advancement in the modern treatment of tuberculous kidney is due to Nitze's invention of the cystoscope. In former times it was not possible to determine the functional capacity of the other kidney, and the mortality of nephrectomy was very high. According to the statistics collected by Küster, the mortality of 223 nephrectomies through the loin ranged from 36 to 52 per cent. Since the introduction of modern methods of diagnosis, by which the capacity of the other kidney can be determined, Watson and Cunningham have

collected the statistics of 292 cases, with a mortality of 8·8 per cent. These statistics have been further analyzed by Watson and Cunningham, showing as follows : 54 per cent of patients were cured ; 19 per cent died after convalescing, half from the disease, the others from other maladies ; 36 per cent showed great improvement, but not a cure.

" In the presence of tuberculous lungs, a nephrectomy is only contra-indicated when the destructive process in the lungs has so far advanced that it is evident a subsequent healing of the lungs cannot take place. In the presence of a tuberculous bladder, clinical experience shows that a beginning bladder tuberculosis heals speedily after extirpation of the diseased kidney ; and tuberculosis of the testicle and prostate are also frequently followed by healing, after the diseased kidney has been removed. If both kidneys have become infected, it is evidently too late for anything but palliative treatment. In cases in which the development of pyonephrosis and sepsis threaten the patient's death, life may be prolonged by a simple nephrotomy, emptying and draining the collection of pus in the kidney, which must be left in to carry on its necessary function."

A very able review of the recent literature relating to indications for operation in tuberculosis of the kidney has been written by Thomson Walker,[4] and it should be referred to for amplification of the views just quoted from the practical article by Morton.

Nephrotomy by means of Silver Wire Traction.—Cullen and Derge,[5] of Johns Hopkins Hospital, have brought forward a suggestion that silver wire passed through the cortex of the kidney by means of a blunt needle, and then dragged on (just as masses of cheese are cut into sections), would sever the renal parenchyma without so much loss of blood as that resulting from the knife. Any procedure which would diminish primary or consecutive loss of blood in kidney exploration would be welcome to the operator.

They write as follows in support of using silver wire to open the kidney rather than the knife :—

One of the reporters was studying Max Brödel's celloidin corrosion preparations of the arborescent branching of the renal artery, and the thought occurred to him : Could it be possible to open the kidney in such a manner as to avoid the two main trunks, and, at the same time, do as little damage as possible to the finer branches ?

If it were necessary to pass a wire between two trees the branches of which interlaced, it is obvious that this could be more readily accomplished, and with less damage to the trees, by passing the wire from below upwards than from above downwards. In the upward passage of the wire, the branches would slip aside, and the twigs and leaves would be the only structures damaged ; whereas, in the downward passage of the wire, the less resistant branches would be broken or considerably bruised. Similarly, were a sharper instrument than the wire used, the same comparative results would be obtained. While all the branches would be severed in its downward passage, a considerable number would undoubtedly escape when the instrument was

directed upwards. With these simple facts in mind, it occurred to the reporters that, anatomically, the proper procedure in performing a nephrotomy would be to cut from within outward; and that some blunt instrument, which would push the vessels aside, would probably give the most satisfactory results.

In order to determine the feasibility of this supposition, a series of nephrotomies was performed on dogs, and the results obtained were very definite and gratifying. A No. 3 silver wire was used as the blunt instrument, and proved very satisfactory, its pliability and low tensile strength making it almost impossible to tear any of the larger branches, providing ordinary care was exercised in pulling the wire slowly outward. Cullen and Derge now undertook two series of experiments on dogs to determine, first, whether the direction of the incision in nephrotomy had any appreciable effect on the resulting hæmorrhage; and secondly, whether the bleeding would be less if a silver wire of low tensile strength (No. 3) was used instead of the knife in splitting the kidney from within outwards. They concluded from the first series of experiments, as one would naturally expect from the tree-like branching of the arterial trunks, that the hæmorrhage was definitely less when the knife was passed from pelvis to cortex, than from cortex to pelvis.

The results of the second series of experiments were even more striking. By threading the silver wire on a straight liver needle (Konsnietzoff-Cullen), it could be passed through the kidney from pole to pole, or transversely at any level desired, without wounding any vessels of moment, inasmuch as the blunt, flat needle easily pushed aside the vascular trunks lying in its course. With an assistant firmly holding the kidney to prevent undue traction on the vessels at the hilum, the organ was easily divided to any extent desired, by a gentle see-saw motion of the wire, with the traction exerted in a cortical direction.

The advantages of the silver wire over the knife were most satisfactorily shown. There was always free bleeding from the cut surfaces where the knife was used, with usually some actively spurting arteries, while following the silver wire divisions, to quote the authors, "how insignificant the hæmorrhage may be was well illustrated in one experiment, where, after the kidney had been split from pole to pole, and the pelvis opened, it was left undisturbed outside the body of the animal, while the other kidney was being operated upon. Though the renal vessels of the hilum were not compressed in the least, and the kidney, pulsating synchronously with every heart-beat, was laid open like an open book, there was practically no bleeding from the cut surfaces several minutes after the incision had been made." It is evident, as the writers go on to state, that very little suturing is necessary after nephrotomy thus performed.

Certainly this work represents a most important advance in renal surgery. It will admit of a wide field of application. It will greatly simplify many kidney operations, and it will in many cases obviate

the necessity of a preliminary control of the vessels at the hilum, and thus do away with the necessity of extensive incisions with division of the muscles.

Since the silver-wire method was devised, Richardson,[6] from whose article this information has been mainly obtained, was fortunate enough to have the opportunity of operating upon two cases on the same day. The silver-wire method was used in both. In the first, the trifling hæmorrhage from the cut surfaces of the kidney was most remarkable, although no compression whatever was being exerted on the vessels at the hilum; but in the second case, he transfixed the kidney from pole to pole with a straight liver needle carrying a silver wire. The kidney was then opened by traction on the wire. But in this case, at several stages of the bisection, very considerable resistance to the passage of the wire was encountered, so that quite strong traction was necessary to divide the organ completely. When it was laid open, the cause for this was evident. The kidney contained several small abscesses: the largest was in the upper pole, and measured about 2 cm. in diameter. These abscesses were surrounded by dense fibrous-tissue walls, which were more resistant than the kidney parenchyma and the vessels. Consequently, strong traction on the wire was necessary to divide them; and as a result of this, many more vessels were torn open than would have been the case had a knife been used and a clean cut made from within outwards. The *bleeding was also very profuse*, and it became necessary to compress the vessels at the hilum in order to control it. A nephrectomy being indicated, the renal vessels, together with the ureter, were skeletonized, clamped and divided, and the kidney removed. The patient stood the operation well; but on the second day of her convalescence, her temperature reached 104° F., and she complained of pain in the right side of her chest. Upon examination we found a small patch of pneumonia, with a friction-rub easily heard over it. Fortunately, this rapidly cleared up, and her temperature reached normal on the ninth day after operation. She then improved rapidly, and was discharged well.

From these two cases we can draw several important practical lessons. The first case is a type of by far the larger group in which nephrotomy is indicated; and it corroborates fully the claims made by Cullen and Berge as to the advantages of the silver-wire method.

The second case, on the other hand, clearly represents a group in which the silver-wire method of nephrotomy is distinctly contra-indicated, for two reasons: (1) Whenever abscesses, fibrous tissue, or other pathological conditions in the kidney render it necessary to exert strong traction on the wire in order to bisect the organ, many vessels will be lacerated; and, consequently, both the damage to the kidney parenchyma and the hæmorrhage will be greater than if a knife were employed. (2) The pulmonary complications in the second case following operation, show conclusively the dangers of omitting compression of the vessels at the hilum, and thus permitting free renal circulation while doing a nephrotomy on an infected kidney.

Richardson feels sure that in this case an infected embolus was swept into the renal vein, thence to the vena cava, right heart, and finally lodged in the right lung, where it produced a localized pneumonia.

It must be remembered that the work of Cullen and Derge was all done on normal kidneys, and that the mechanics of the method precludes its rational application to a group of cases illustrated by the second one. In the vast majority of cases, however, by combining the silver-wire method of nephrotomy with the anatomical points established by Brödel, one obtains a most satisfactory operative technique.

In conclusion, it should be emphasized that complete longitudinal bisection of the kidney is comparatively rarely indicated. The non-vascular zones are so clearly marked, that one can make transverse divisions of the parenchyma, and open the pelvis at almost any level desired; or one can safely combine a transverse with a longitudinal division, if it be indicated.

Partial Nephrectomy.—This operation is so rarely possible that the case recorded by Barling,[7] in which he was able to resect part of the left kidney, arrests attention. It is to be noted that, cystoscopically, he discovered two left ureteric openings; and when the left kidney was exposed through the usual oblique loin incision, it was noticed that the lower half of the kidney was fixed with dense matted inflammatory exudate, and it was with difficulty brought into view. The upper portion of the organ—exactly two-thirds of it—was unusually firm in consistence, but otherwise apparently quite healthy; the lower third was in a condition of complete sacculation, and presented a yellowish-white colour in contrast to the brownish-red of the upper healthy portion. The pelvis of this lower third was much dilated, as was the ureter also (to the size of a No. 14 E. catheter). No stone could be detected in the pelvis or ureter. The latter was therefore opened, and a bougie passed easily into the bladder, showing the absence of stone or stricture. After considerable search, the second ureter was found clinging closely by dense adhesions to the diseased ureter and dilated pelvis. Much trouble was required to separate the two, and it was feared that the nutrition of the healthy ureter might have been damaged. The "second" ureter which drained the lower third was now clamped and divided. A clamp was next placed on the vessels of the kidney, and the lower third of the kidney excised. Lest any renal tissue should be left on the truncated lower end of the upper healthy portion, that end was carefully curetted with a Volkmann spoon, and the end was whipped over with a continuous catgut suture. The clamp was now removed from the vessels; very little bleeding occurred. The remaining portion of kidney was returned into the loin, and the wound closed except for a drainage opening.

Shock after the operation was extremely marked, much more so than in an ordinary case of nephrectomy for a pyonephrosis. This was probably due in part to the difficulty of stripping out the kidney in the first instance, and to some extent also to the rather prolonged

nature of the operation, which occupied much more time than an ordinary nephrectomy.

The removed portion contained pus, and showed a single cavity continuous with the dilated pelvis. Renal tissue was almost completely absent, and a section of the walls of the sac failed to find evidence of tuberculous infection.

Stone in the Kidney.—Dean Bevan,[8] of Chicago, gives his experience of seventy cases of kidney stone, which he suggests form "as a result of low-grade mycotic infection," questioning whether the "germ forms producing the infection are not probably colon and typhoid." He outlines the treatment which he considers should be adopted for those stones definitely lodged in the kidney and too large to traverse the ureter. He advocates operation very strongly, holding that there are but two contraindications—kidney stone in the very old, and in those suffering from organic disease with a bad general condition. [In this judgment he differs from some who hold that certain calculi are best left alone: *vide infra*.—E. H. F.].

He sums up the relative value of pyelotomy, nephrolithotomy, and nephrectomy thus (the extract is of course not given as original work, but merely as reflecting the Chicago school of surgery):—

"Pyelotomy—the incision into the pelvis of the kidney and removal of the stone—is the operation of choice in cases of small stones in the pelvis or stone of fair size limited to the pelvis. The incision should be closed with one or two fine catgut sutures, and drainage provided—best with cigarette drains to the point of incision in the pelvis. This is an ideal operation, is free from hæmorrhage, and gives a rapid, smooth recovery, with little menace to the kidney or the patient.

"Nephrolithotomy is the operation required for multiple stones, stones in the upper or lower pelvis, stones in the calyces, or branched stones, or stones with gross infection. In doing a nephrolithotomy, the kidney should be so freed from its fatty capsule that it can be brought well out of the external incision. The vessels should then be compressed by an assistant with his fingers, never by clamp forceps as has been sometimes suggested. A cut should be made about a centimeter behind the convex border of the kidney and parallel to it, through the kidney substance, down on to the stones or stone, or into the pelvis. In some cases of large branched stones, the kidney must be completely laid open as in a post-mortem examination."

After the removal of the stone, the line of incision is closed with catgut sutures. These, when properly applied, will control the bleeding completely. No drainage should be employed unless in the presence of gross infection with pus; and here, Bevan thinks, "it is as a rule, where the conditions warrant, better to remove the kidney. A cigarette drain is carried down to the point of closure of the kidney wound. The one great objection to, and danger in, nephrolithotomy is hæmorrhage. As a rule, this is a matter of no moment, and the patient goes on to a good, smooth recovery as in the usual case of a pyelotomy. In some cases, however, no matter how much

care has been exercised, hæmorrhages will occur. I have had four or five cases of hæmorrhage — one fatal, in removing a huge collection of stones from a kidney which was the only one possessed by the patient. In two other cases, hæmorrhage was so severe and persistent that, although the external wound had healed completely and the blood came down through the ureter into the bladder, I was compelled to remove the kidney to save the lives of the patients, the hæmoglobin having been reduced in one case from 90 to 28, and in the other from 95 to 40. I have however, had several other cases in which, the hæmorrhage ceased and the patients went on to a recovery."

Nephrectomy is the third operation which must be considered in operating on patients with renal calculus. Bevan states his results have improved, especially in the last few years, because he has recognized more than formerly the necessity of doing a primary nephrectomy in cases in which the kidney was so badly diseased that it was of no value, and if left would give rise to trouble.

A great deal of work has been done to determine by different methods the functional capacity of the kidneys and of the separate kidneys. In spite of rather enthusiastic claims of these various methods— cryoscopy, the phloridzin test, the electric conductivity, the indigo-carmine test, etc.—we are, Bevan believes, coming to regard these with little confidence. "I am," he says, "in my own clinic still resorting, in cases in which a possible nephrectomy is considered, to a cryoscopic examination of the blood and the phloridzin test. I must say, however, that I am controlled not so much by these as by more tangible evidence in my decision for or against a nephrectomy in a given case. This more tangible evidence consists in the following: (1) A cystoscopic examination, with catheterizing the ureters to determine the presence of both kidneys; (2) The estimation of the total solids and urine output for several twenty-four-hour periods; and (3) The gross appearance as seen at the operation of the cross-section of the diseased and stone-bearing kidney itself. If there is kidney sufficiency, as shown by repeated examinations of the total urine output, the surgeon of experience can determine from the gross examination of the kidney on section whether it is doing enough work to make its retention necessary. If it is evident that it is of little value, then a primary nephrectomy should be chosen, as it will save the patient from a secondary nephrectomy, which will be much more difficult and dangerous than the first operation.

Bevan prefers ether, but operates frequently under nitrous oxide; he strongly advised that nitrous oxide should never be used in a bad heart case.

[Criticism by the Editor of Section.—*Our judgment, in advising removal of stone from the kidney*, should, I hold, be formed on the blending of three independent opinions: the patient with the knowledge of his own suffering, the practitioner in the knowledge of his patient's general condition, and the surgeon in his special knowledge of the *x*-ray and the urine.

The practitioner is often relied upon by his client to give an opinion as to the advisability of removing stone from the kidney. Unfortunately, his opinion cannot be as well balanced as that formed by an unbiassed operator, because his experience of the actual operation, its risks, its difficulties, and its end results, is small and often book-inspired. But he can frame a general opinion upon sound grounds. He will not, I think, go far wrong if he is guided by the amount of distress or pain which is suffered by the patient. If he can be assured that a stone is present—and an expert radiographer skilled in the translation of shadows can tell him this;—if, moreover, the size of the shadow precludes any chance of the stone passing along the ureter—and as a general rule if a shadow is found in the kidney, the stone casting that shadow will not pass; — then he must estimate the "vis" of his patient. If moreover, he has watched his patient, he can gauge to some extent the suffering and the bodily exhaustion of the attacks. If the energy, health, and duties of life are frequently or seriously crippled by the suffering, then by all means let him seek the opinion of an operator as to the necessity of an operation, and let the practitioner's knowledge aid, and if possible coincide with, the operator.

The question from an operator's point of view should not be settled by the fact that the radiograph shows a stone to be present. *I assert that a stone in one kidney may sometimes be of more value to the individual if it is left than if it is removed.* I also submit that the question of removal should turn upon the character of the urine, whether it be phosphatic; upon the shape of the ureteric nose of the stone, as demonstrated by the *x*-ray shadow; and upon the position of the stone or stones in the kidney itself. Let me amplify these four propositions:

1. A stone may indeed be of more value if it is left in the kidney than if it is removed. Such a proposition is rank heresy to the present age; but a little reflection will show that it is tenable, and I do not doubt that in a decade, judicious surgery will take this anomalous point into careful consideration. There are some forms of stone which invariably recur after removal, for instance, the lime-phosphate. The kidney may be cleaned out thoroughly, but the stones rapidly reappear in the dilated pelvis or calyces, or spaces emptied by the operator, and within the year fresh radiographic shadows will appear, indicating recurrence. Remove these again—and understand that each removal damages the secreting structure of the kidney, despite all that can be affirmed to the contrary—and they again recur, until the kidney finally ceases to work and lime-phosphate is no longer deposited. But in this case the other kidney begins the same function of phosphatic excretion, and probably the same habit of phosphatic-stone formation. Why this deposit should appear in *one* kidney, and why it should, in a certain proportion of cases, only continue to accumulate in the one kidney, is not the question. That it does happen is a clinical fact. The affected kidney is the separator of the excess of lime phosphate from the body, and

this is an important point when one has to decide upon interfering with its functions.

Now, as long as this kidney is depositing its phosphatic excretion easily and semi-injuriously upon an encased stone, and is permitted to live—so long as this pathological excretory function is not meddled with—the better for the unfortunate patient who is afflicted with the phosphatic dyscrasia. He will live longer, and, all things considered, run less risk than if his renal stone is removed. It is also a fact that this particular form of stone, once it becomes branched, ceases generally to give pain, and years may ensue before a little pyelitis appears and causes renal suffering. These years of freedom from pain are so many years' gain in the patient's life, for they are obtained without interfering grossly with the action of the kidney.

Such a stone or stones will, if left alone, grow gradually, it is true, and press injuriously on the kidney ; and finally, as years go by, induce persistent phosphatic pyuria and ultimately destroy it ; but it will probably save the other kidney from being the site of phosphatic deposit at an early period in the life of the patient.

But presuming his suffering and the crippling of his life are so great that operation is urgently needed, the surgeon must act, of course ; but in doing so he should, I submit, obliterate all dead spaces in the kidney as much as possible and endeavour to secure free ureteric drainage to the dilated pelvis.

2. Why should the judgment depend on the character of the urine ? One knows that oxaluric stones which have not set up pelvitis are very slow in formation : that they destroy the kidney in the course of years. not months. Hence there is no great hurry to operate in oxaluric stones, provided the suffering is not excessive and the urine is sterile, If the urine is infected and the kidney greatly disorganized, the question of entire nephrectomy must be raised, but this depends on the character of the infection. Practically speaking, the more offensive the urine the greater the probability of the need of nephrectomy.

3. The operator's judgment of the necessity for the removal of stone from the kidney is greatly influenced by the shape of the shadow cast by the stone, and the position of the shadows which may be noticed in the renal parenchyma as distinct from that in the pelvis of the kidney. Should the stone be of a shape in which a distinct nose is distinguishable as occupying the pelvic orifice, I feel sure that, other things being equal, the sooner it is removed the better, for this nose or projection denotes a mould of the ureteric orifice of the pelvis which invariably leads to back-pressure, distention, and infection of the pelvic cavity, and this again to renal destruction.

4. If, however, shadows, independent, isolated, and well marked, can be distinguished by the radiograph in the body of the kidney, the necessity for interference is still more urgent, as these signify that dilatation, not only of the pelvis but also of the calyces, has taken place, and therefore that great destruction of the secreting tissue of the kidney has supervened.

Lastly, I submit that in some cases of *painless* mass stone—that is, when the greater part of the kidney is gone and its place taken by a huge branched sterile lime-stone, it is better to leave it alone—and when both kidneys are stuffed with painless stones, it is to the patient's ultimate advantage to do nothing.—E. H. F.][9]

Distended Renal Pelvis or Appendicitis, or Gall-stone or Ovaritis.—Anything which lessens the difficulties of abdominal diagnosis is of prime importance, and especially is this true when differentiating between the causes of symptoms in the right lower quadrant, where the confusion of affections of the kidney with those of the appendix, gall-bladder, and uterine appendages may lead to serious errors in the placing of incisions and the relief of symptoms.

Leonard Freeman,[10] of Denver, advocates Kelly's method of **Distending the Renal Pelvis** with sterile salt solution or boric water in obscure pains in the right quadrant of the abdomen. He considers that the greatest difficulties in differential diagnosis lie with intermittent hydronephrosis, the attacks of which come at intervals, like the exacerbations of chronic appendicitis or gall-bladder trouble, when the kidney is not sufficiently enlarged to permit of its palpation. These attacks are due to occasional obstruction to proper drainage, from kinking of the ureter, or other causes. This obscure disease has been known for long, but is often overlooked and often the cause of operative error.

It will be remembered that a diagnostic clue suggested by Kelly could be obtained by passing a ureteral catheter up to the kidney by means of a cystoscope and dilating the renal pelvis with a solution of salt and boric acid. If the pelvis contains much more than it normally should, a corresponding degree of hydronephrosis must be present; and in addition, as soon as the pelvis is completely filled, pain is produced, which serves to locate the seat of the trouble, in that it does or does not correspond to that from which the patient has previously suffered.

It is very satisfactory to note, says Freeman, the promptness and accuracy with which patients locate the pain produced by a distended renal pelvis. There is no doubt about it, and no suggestions have to be made. They often say, "There, that is just like my old pain;" or "That hurts me, but it is not like what I have always felt before." Sometimes the discomfort is considerable, but it soon wears away as the kidney empties itself, and no harm results.

As with other means of diagnosis, excessively nervous or hysterical individuals may be difficult to deal with, and it is possible that erroneous conclusions might be reached; but this does not often occur, and affects the general usefulness of the procedure but little.

There is some difference of opinion as to the normal capacity of the renal pelvis, but it can be said with certainty that, when it contains over 50 cc., hydronephrosis exists, this being usually accepted as the proper standard. Kelly and others, however, affirm that anything over 7 to 10 cc. indicates a pathological condition, and Freeman has

found, in numerous instances, that pain is produced in the normal kidney by the insertion of this amount of fluid.

The technique of the procedure is simple. The end of the ureteric catheter must enter the renal pelvis. The solution must be warm, and should be slowly injected so as not to cause renal colic prematurely. If the fluid is strongly tinged with methylene blue, the mouth of the ureter may be observed through the cystoscope during the process of injection to make sure that too much of the solution does not escape around the catheter, which, however, is seldom the case. In injecting the solution, a syringe may be used with a metal plunger, to facilitate sterilization, and with a small pointed tip that will fit accurately into the ureteral catheter. It should be of considerable capacity, and graduated in cubic centimetres.

An "Improved" Method of Measuring the Capacity of the Renal Pelvis.—Baker, having become dissatisfied with the usual technique for measuring the capacity of the renal pelvis because there was no gauge for the amount of pressure used in filling the renal pelvis, and there being no standard for comparison (the forcing of the fluid through the catheter with a syringe is necessarily done with uneven pressure which tends to produce renal colic before the renal pelvis is filled), devised an apparatus, consisting of a glass burette graduated into cubic centimetres and of 100 cc. capacity. It is filled with sterile methylene-blue solution; a rubber tube leads from the burette, which is fitted into the ureteral catheter by a brass connection; from the top of the burette a rubber tube leads to an air-pressure gauge, which is fitted with a cautery inflating-bulb. With the ureteral catheter in the renal pelvis, the bulb is inflated, and the fluid is forced into the kidney pelvis under a uniform pressure. When the renal pain occurs, indicating that the kidney pelvis is distended, the reading of the pressure-gauge is taken, and the amount of fluid which has passed from the burette into the renal pelvis is seen at a glance.

Deformities of the Renal Pelvis.—It is becoming increasingly evident that moderate dilatation of the renal pelvis occurs in conditions other than that of hydronephrosis, and that the study of these dilatations is gradually clearing up obscure cases of renal pain. Much light was thrown upon the capacity and shape of the renal pelvis by Jordan Lloyd, who in 1887 injected many post-mortem kidneys with paraffin; but since radiography has been utilized, the renal pelvis has been studied in the living subject.

Prof. Voelcker,[11] of Heidelberg, made a radiographic demonstration of the outline of the renal pelvis over two years ago, using collargol as the injecting medium. He demonstrated several cases of hydronephrosis in this manner, and suggested further possibilities of the method as an aid to renal diagnosis.

Uhle, Pfahler, Mackinney, and Miller,[12] of Philadelphia, used 50 per cent colloidal silver oxide (sold under the name cargentos). It is not irritative, and throws a fine shadow with the *x*-ray. [There is obviously a mistake in this report that 50 per cent

colloidal silver oxide was used. Such a preparation cannot be made.—E. H. F.]

Braasch,[13] of Rochester, Minnesota, used a 10 per cent solution of collargol as the injecting medium, and was able to outline the pelvis quite definitely by means of the *x*-ray. He reports quite a series of excellent cases, but at present his findings are too small in number and too much at variance to be depended on.

The chief use of this method will be to differentiate abdominal tumour in the neighbourhood of the kidney. Large pancreatic and ovarian cysts, intestinal, gall-bladder and stomach tumours, and various perirenal growths with indefinite histories, which may easily be confused with renal conditions. In such cases, if a collargol radiograph is made, and the renal pelvis is found to be in the *normal position* and with a *normal outline*, the tumour is probably not renal.

[Mem.—The injections into the pelvis must be warm, and given slowly and by gravity (the curette being held two feet above the body), so as not to cause sudden distention of the kidney pelvis, which provokes renal colic. Five cubic centimetres only of the solution is employed. This was quite enough, from the radiographic point of view.]

References.—[1] "Injuries of the Kidney," *Ann. Surg.* vol. 1909; [2]*Med. Rec.* Mar. 12, 1910; [3]*Zeits. f. Urol.* Bd. 3, Hft. 4, 1909; [4]*Pract.* Nov. 1909; [5] "The use of Silver Wire in Opening the Kidney," *Johns Hop. Hosp. Bull.* No. 224, Nov. 1909; [6]*Ibid.* Mar. 1910; [7]*Ann. Surg.* Dec. 1909; [8]*Jour. Amer. Med. Assoc.* Feb. 26, 1910; [9]Fenwick, "Radiography of Urinary Stone," p. 31; [10]*Surg. Gyn. and Obst.* 1910, p. 36; [11]*Ibid.* Ap. 1910; [12]*Ibid.*; [13]*Ibid.*

KIDNEY, TUBERCULOSIS OF *Francis D. Boyd, M.D.*

Wildbolz,[1] in an important communication, discusses at length the tuberculin treatment of renal tuberculosis, both from the histological and the clinical standpoint. A number of cases are recounted, one of which is of particular importance. The patient suffered from renal and vesical tuberculosis, but had no other recognizable tuberculous lesion. She underwent four consecutive tuberculin cures without the healing of the kidney tuberculosis; yet the conditions were relatively favourable to a cure, the general health was good, and the tuberculous process in the kidney had not got as far as abscess formation; even after eight years it had not become caseous. Not only was there no clinical evidence of healing in this relatively favourable case, but after excision of the kidney no histological evidence could be recognized of any healing process directly or indirectly ascribable to the tuberculin.

The present writer has treated thirty-one cases of renal tuberculosis with **Tuberculin.** All were improved in general health and increased in weight during the cure. Harmful results from the use of tuberculin were never seen, the dose being carefully selected to avoid any reaction. Unfortunately, tuberculin enthusiasts too often employ it without a thorough and scientific investigation of the extent and gravity of the tuberculous process in the kidney. It is thus that tuberculin

becomes discredited both by doctors and patients, and time is lost, and with it the possibility of surgical interference. Tuberculin should *not* be used in renal tuberculosis without very careful consideration of the individual case.

Advanced cases, both of single and of double-sided renal tuberculosis, are *not* suited for tuberculin treatment. They cannot be cured, and may be injuriously affected. As in severe pulmonary tuberculosis, so also in advanced renal tuberculosis, the organism is often over-weighted with tuberculin, and its therapeutic use can only do harm. In renal tuberculosis we have to deal, not with shut-off tuberculous nodules, but with tuberculous centres which communicate freely with the circulation. The excreted urine contains considerable quantities of the specific toxin, and there is ample opportunity for its absorption from the pelvis of the kidney and for autointoxication. Clinical experience of kidney tuberculosis teaches that tuberculin over-weighting of the body occurs relatively rapidly, and thus the use of the tuberculin cure may be contraindicated. The greatest care is necessary in the use of tuberculin in these cases if harm is to be avoided.

It is otherwise with *early* cases. Therapeutic doses of tuberculin favourably influence the general health, and there is a faint possibility of improving the local lesion. In early cases, if double-sided, a tuberculin cure may be advised, for no other therapy has given more favourable results. If one kidney only is tuberculous, the question becomes doubtful. If the damaged kidney shows defective functions, **Nephrectomy** should be advised, as it gives a better chance of cure, and delay is dangerous. If, on the other hand, the functional activity of the organ has not distinctly suffered, and minor centres of tuberculosis are suspected, it is wise to try specific therapy before proceeding to extirpation of the kidney. (See also preceding article.)

REFERENCE.—[1]*Berl. klin. Woch.* June 27, 1910, p. 1215.

LABOUR. *Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.*

Placenta Prævia.—Herman,[1] discussing the treatment of placenta prævia, considers that the mother's life is always to be placed before the child's. One immediately fatal hæmorrhage is uncommon, but occasionally occurs. The first principle of treatment, therefore, is to induce labour directly the condition is diagnosed ; or if the os is wide enough to admit of it, to bring down a foot and deliver gently. In the absence of wide dilatation, Champetier's bag is indicated. It has been objected that it displaces the head ; but this is not a matter of moment, as version can be done immediately the bag is expelled. The mortality of placenta prævia is 5 per cent in lying-in hospitals. It has been advocated in some quarters to deliver by Cæsarean section. The mortality of this operation is 8 per cent in lying-in hospitals, though no doubt this figure will be lowered in the future. In placenta prævia, labour is nearly always premature, so that the child is small, and presents no difficulty in delivery. For this reason Herman does not consider the major operation is an improvement in

treatment over the old-established methods of the bag and version. He condemns vaginal plugging, even as a temporary measure, as useless.

Veit[2] absolutely rejects Cæsarean section as a treatment for placenta prævia. He considers version excellent as regards the mother, but admits that the fœtal mortality is considerable. Rupture of the membranes requires skill when it has to be performed in these cases. It is only useful in lateral implantation and when the head is presenting. De Ribes' bag (metreurysis) is admirable, but Veit insists that it must be introduced into the amniotic cavity ; unless this is done the placenta is extensively separated. Occasionally the bag may fail to excite pains. In regard to Cæsarean section, Veit admits that presupposing a bacteriologically " clean " state of the genital passages and proper technique, the operation should theoretically be free of risk to the mother. As regards saving of infantile life, Veit is of opinion, from a study of nineteen cases of placenta prævia delivered per vaginam, that not much improvement is to be hoped from the major operations, for in these cases the child is nearly always premature, often diseased, and sometimes dead. Taking this into consideration, and the fact that in no cases can cleanliness of the vagina be assumed with certainty, he is of opinion that Cæsarean section has no place in the ordinary treatment of placenta prævia, though he admits that in very exceptional cases it may be the proper course.

Discussing vaginal hysterotomy (vaginal Cæsarean section), this authority sees in it no advantage over forcible dilatation of the cervix (*accouchement forcé*), provided that the rents necessarily made are sutured afterwards. He does not approve Bossi's instrument, but performs the operation by hand and the dilating effect of the fœtal bulk. Suture of the cervical lacerations is quite easy, and always controls the hæmorrhage.

Veit's views may be thus summed up : If the child is dead or immature, bipolar version should be performed, and the woman allowed to deliver herself. With lateral insertion rupture the membranes if the head presents, but in all other presentations introduce a bag, and perform version and extraction directly it is expelled. If the insertion is central, *accouchment forcé* is indicated, or delivery by vaginal hysterotomy. This paper is a very valuable contribution to the subject, written as it is by an authority of ripe experience.

Labusginère[3] reviews the subject of the surgical treatment of placenta prævia. Both Sellheim and Krönig recommend Cæsarean section—the former by the extraperitoneal method. (See under CÆSAREAN SECTION for illustrated account by H. Sellheim of his method.) Baisch recommends vaginal hysterotomy, but admits the operation is not for the general practitioner. On the other hand, H. Martin and Veit oppose such methods ; and Blumreich, out of seventy-four cases, only found one in which it was necessary to perform Cæsarean section owing to rigidity of the os. Hannes quoted 246 cases treated by the older methods. The maternal mortality was 6·6 per cent, and the fœtal 30

per cent. Thies gives the following figures bearing on fœtal mortality: Spontaneous delivery, 20 per cent; vaginal plugging, 33 per cent; version and slow extraction, 80 per cent; version and rapid extraction, 64 per cent; vaginal hysterotomy, 50 per cent; metreuresis (bag), 14 per cent. Mason and Z. Williams, after analyzing 155 cases, recommend version with rapid extraction for multiparæ, but Cæsarean section for primiparæ. The author of this useful paper, referring to the results of the Clinique Baudelocque, concludes that the indications for hysterotomy or Cæsarean section must be exceptional.

Hammerschlag[4] concludes that Cæsarean section, if systematically adopted, would give no better results than the methods now in common use. Combined version by Braxton Hicks' method is indicated if the child be dead, or unlikely to survive; but in the converse, Champetier's bag is the best treatment.

Neu[5] states that as a result of routine Cæsarean section in fifty cases of placenta prævia, the maternal mortality was 8 per cent, and the fœtal 58·4 per cent.

A discussion on the place of Cæsarean section in the treatment of placenta prævia took place at the Royal Society of Medicine in April, 1910.[6] Jellett, quoting figures from the Rotunda Hospital, showed that of 138 patients 3·6 per cent died. In all but one the patient was already moribund, or gravely infected, before admission. Bipolar version was the method of election. This was impossible: (1) Where the cervix was undilated and rigid; (2) Where the uterus was contracted down on the child; and (3) Where the presenting part was fixed in the brim. He favoured plugging the vagina in most of these cases, or, as an alternative, incision of the cervix sufficient to perform version. He was unable to see any place for Cæsarean section. Spencer and Champneys considered it only rarely justified, and A. Routh recalled one case in his experience where the cervix was so rigid as to indicate it. Gow considered that it was only in cases of central insertion that the question need be considered. In his opinion it was indicated under the following combination of circumstances: central insertion, a rigid os, free bleeding on manipulation, favourable surroundings, the mother not in a state of collapse, and the child alive and near full term.

It will thus be seen that the subject has been very fully considered. Most British obstetricians will, one opines, agree with Gow's views, namely, that in the great majority of cases the condition is admirably met by the methods up to now in common use, and that the maternal and fœtal mortality, as it at present stands, is due to causes over which there is little further control. Nevertheless, in certain cases, each to be considered in regard to its peculiar circumstances, delivery is best effected by Cæsarean section.

Eclampsia.—An exhaustive review of the enormous literature bearing on this subject has been published by Eardley Holland.[7] It should be read by all interested in the subject, and brings it up to date since Comyns Berkeley wrote a similar review in the same

publication some years ago. Much investigation has been devoted to this disaster of child-bearing during the last five years, and valuable facts have been discovered. On the other hand, many worthless theories have been propounded. The conclusions to be drawn from a study of the subject may be thus summarized : (1) There is no special eclamptic toxin. (2) The disease is an auto-intoxication in which a profound disturbance of protein metabolism plays the chief part. (3) The chief toxic substances are the products of the disintegration of protein. (4) These substances are produced by the raised activity of intracellular ferments causing autolysis of the body cells. (5) The primary cause is to be sought in the placenta, which probably produces substances activating proteolytic ferments in other parts of the body.

Herman,[8] speaking of the treatment, strongly deprecates methods of forced delivery and Cæsarean section in these patients, his argument being that there is no evidence that the results thus obtained are better than those of expectancy. He believes **Morphia** to be the best drug to use, and considers that bleeding has a distinct place. Saline infusion he is less inclined to praise ; but if it is performed, continuous administration into the cellular tissue in the manner described by Barnard is, in his opinion, the method of election.

In a discussion on the subject at the Royal Society of Medicine,[9] most of the speakers were inclined to the opinion that in view of the results of modern research on the disease, the emptying of the uterus should theoretically be followed by good results, and that in exceptional cases with a closed rigid cervix, delivery by Cæsarean section was indicated. The statistics of Continental obstetricians, such as Bossi, Zweifel, and Bumm, showed that the maternal mortality was lessened by active treatment. On the other hand, delivery did not guarantee immediate cessation of the fits, whilst in a certain proportion the onset of eclampsia was post-parturitional.

Depression of the Cranium in the Newly-born. — Commandeur[10] contributes a long paper on this subject. He divides the depression into those on the parietal bone, those on the frontal, and those on both bones. Nearly all are caused by the sacral promontory. The bone is usually merely bent, but may be fractured. In many, intracranial hæmorrhage, either extra- or intra-dural, co-exists. If left alone, the depression is sometimes reduced spontaneously, but the prognosis is doubtful.

There are two methods of treatment: the first (Munro Kerr's) being manipulation applied to the skull beyond the periphery of the depression ; and the second, operation. The first should always be tried to begin with. If it fails, the operation of Vicarelli is recommended. The bone is laid bare by incision (if the operation is done at once the scalp is sterile), and a screw is fixed into the bone, which is then pulled into proper position. An alternative is to introduce an elevator between the bone and the dura. Care must be taken in this to avoid injury of the middle meningeal artery. The dura will not separate at the suture lines. In frontal depression the elevator should

be inserted through the coronal suture, and this also does well for parietal depressions. The lower edge of the parietal bone should be avoided because of the middle meningeal artery.

The mortality without operation is 14 per cent. The indications for operation are as follows:—If the child cannot be resuscitated, it should be operated on at once. If in spite of reanimation it can only be got to whine, or if convulsions, contractures, or paralyses supervene, it is also indicated. Frontal depressions should always be operated on; but parietal depressions, if causing no symptoms, may be left alone. If, however, they have not disappeared in ten days, they should be raised.

Ophthalmia Neonatorum.—Munro Walker[11] has made an important communication on this subject with special reference to the teaching of midwives. The prevention of this all too common cause of blindness may be carried out on one of two lines: (1) The antiseptic, which relies on the use of strong antiseptic solutions dropped into the eye, and assumes infection in every case; and (2) The aseptic, which contents itself with putting nothing into the conjunctival sac unless there is definite reason to fear infection. The first method, with which the name of Credé is prominently associated, is that most commonly used. Walker, however, believes that the results obtained by Credé were due, not to the instillation of silver nitrate solution, but to the previous washing of the child, and the wiping of its eyes with clean linen and ordinary water. "In other words, the silver nitrate drop resembles the carbolic acid spray in general surgery, which was at first thought to be the chief element in the prevention of wound infection, but as the principles of bacteriology became more and more understood, was relegated to a subordinate position, and finally abandoned." From carefully observed cases at St. Paul's Hospital, Liverpool, figures are quoted showing that the results of the aseptic method are better than those of the antiseptic, and in Walker's opinion indicate that it is necessary to review the whole question anew. Prevention is better than cure; and there is no antiseptic known which is able to kill the gonococcus without causing grave injury to the tissues of the eye. Statistics show that in at least a third of the cases the symptoms begin after the fourth day from birth, and that the infection, therefore, is very often secondary, and occurs after the instillation, which is thus not only powerless to prevent it, but may, by damaging the vitality of the tissues, actually favour it.

Walker formulates rules which he suggests should be made the basis of the teaching of midwives on this subject. The most important are as follows: (1) The infant's eyes are taboo: nothing should be put in them, except in undoubted infection, when she may wash them out with saline solution; (2) As soon as the head is born the eyes should be wiped with clean swabs, one for each eye, and the child should not be allowed to rub its eyes with its fist till after its first bath. During this procedure none of the bath water should go near its eyes. These must be washed separately.

REFERENCES.—[1]*Hosp.* Ap. 16, 1910; [2]*Med. Press,* July 6, 1910; [3]*Ann. de Gyn. et d'Obst.* July and Aug. 1909, in *Brit. Jour. Obst. and Gyn.* Oct. 1909, p. 289; [4]*Münch. med. Woch.* No. 32, s. 660, in *Ibid.* p. 290; [5]*Ibid.* in *Ibid,* p. 291; [6]*Trans. Roy. Soc. Med.* Ap. 1910; [7]*Brit. Jour. Obst. and Gyn.* Sept. Nov. and Dec. 1909; [8]*Clin. Jour.* Feb. 16, 1910; [9]*Brit. Jour. Obst. and Gyn.* Sept. 1910; [10]*L'Obstétrique,* July, 1910, in *Brit. Jour. Obst. and Gyn.* Sept. 1910; [11]*Brit. Jour. Obst. and Gyn.* June 1910, p. 520.

LABYRINTH, DISEASES OF. (*See* EAR, DISEASES OF.)

LARYNGEAL TUBERCULOSIS. *W. Milligan, M.D.*
D. Lindley Sewell, M.B.

J. Dundas Grant[1] recommends the **Injection of Alcohol** into the superior laryngeal nerve in the treatment of the severe dysphagia so frequently present in cases of laryngeal tuberculosis. The solution used (2 gr. of hydrochloride of eucaine β in an ounce of 80 per cent. alcohol) is injected with Schlösser's syringe, the point of the needle being so bevelled as to minimize the risk of injuring any blood-vessel. The patient is placed in the horizontal position, and the sound side of the larynx is pressed over with the thumb of the left hand towards the middle line. The space between the hyoid bone and the thyroid cartilage is then carefully palpated until the patient complains of a painful spot. Over this area the needle is introduced and pushed into the tissues for a distance of 1½ cm., and its point is carefully moved about until the patient complains of pain shooting up to the ear. The injection of fluid is made slowly, and until all pain in the ear passes off.

REFERENCE.—[1]*Lancet,* June 25, 1910,

LEISHMANIASIS. *J. W. W. Stephens, M.D.*

F. Mills[1] states that kala-azar is far more prevalent in Behar, India, than previously supposed. He records the following symptoms and complications as common to all the cases: Alternating, remittent, and intermittent fever, commencing with rigors; enlargement of liver and spleen; progressive debility; emaciation, without corresponding anæmia; albuminuria; œdema of the lower extremities. As special symptoms the author records dysentery, epistaxis, duodenal ulcer, pigmented skin, hyperæsthesia of lower extremities, general œdema, and pseudodiphtheritic tonsillitis.

W. S. Harris and C. C. Cumming[2] record two cases of kala-azar treated by the arylarsonates without success.

R. G. Archibald,[3] as the result of the examination of the blood serum in four cases of kala-azar, comes to the conclusion that the alkalinity is diminished, and suggests in the treatment of the disease drugs such as **Calcium Lactate,** which would tend to increase the alkalinity. The absolute count was 4,680 leucocytes per cmm. The following figures represent the relative count: Polynuclear 43, large mononuclear 32, lymphocytes 23, transitional 1, eosinophile 1. It must be remembered that, according to others, there is no large mononuclear increase, but a lymphocyte increase.

C. Donovan[4] discusses the mode of infection of kala-azar in relation to dogs and to the reduviid bug (*Conorrhinus rubro-fasciatus*, de Geer). As is well known, dogs in Tunis, where infantile kala-azar exists, contain a species of leishmania, and they may be the sources of the infection. The author has examined 1150 dogs in Madras, but has not found leishmania, piroplasma, or trypanosoma in any. The only parasite present was *Leucocytozoon canis* in 8 per cent. The author's attempts to get any developmental forms of *L. donovani* in the bug above-mentioned have failed.

W. H. Graham Aspland[5] states that infantile kala-azar is common in Pekin, and probably in the whole of North China, many medical men there being familiar with a disease in children characterized by enlarged spleen, anæmia, diarrhœa, and necrosis of the mouth, so typical of these cases. The features presented by the disease in Pekin are: (1) Age rarely under two years and never over ten. (2) The spleen is always much enlarged, in later stages filling the pelvis. (3) Diarrhœa in the later stages, constant and severe. (4) Great debility generally, but not pronounced until the cancrum oris has set in. (5) "Cancrum oris." The condition does not really affect the cheek, but begins at the root of the upper or lower central incisors, the teeth dropping out in a week or so, leaving a black slough. The author favours a syphilitic origin of the disease, although *Leishmania sp.* was found in the blood (? number of cases). (6) The disease is always fatal. (7) As regards fever, no data were obtainable.

G. A. Williamson,[6] commenting on the previous communication, states that these symptoms of infantile kala-azar in North China are the same as those of ponos in Spetzia; that the Greek name "ponos" signifies a sore, from the gangrene occurring in some patients. In the Grecian form the "cancrum oris" also starts in the gums, the teeth falling out.

R. Markham Carter[7] considers that under the term "Oriental sore" in North India, several conditions are comprised. He separates the following: (1) "Monghyrphora," a pale yellow, painless, raised area, $\frac{1}{4}$ to $\frac{1}{2}$ in. square, surrounded by a faint red margin. This sore occurs near the lips, eyes, or on the cheek or forehead; it lasts for a year, does not break down, and heals with a faint scar. It may recur on other parts of the body, such as the elbow or wrist. (2) Chambal: a large, flat, fairly deep ulcer. (3) Typical Delhi boil.

D. B. Thomson and A. Balfour[8] describe two cases of a peculiar form of non-ulcerating Oriental sore, which they prefer to call Leishman nodules, in Egyptian soldiers. The growths occur in groups, and were present on the neck, face, shoulder, arm, thigh, and elsewhere. They are said to begin as pink circular points. When they have reached the size of a pea, secondary points appear around them. These grow, and eventually join the original mass, which now has an irregular outline like a mountain on a raised map. The tumours are pink, shiny, not scaly, and show no signs of breaking down. They feel smooth, firm, yet soft, and are freely movable. On section, to the

naked eye the growths appear fibrous. They varied in size from 2½ × 2½ mm. to 20 × 18 mm. Films made from the blood taken from the growth show parasites (*Leishmania sp.*), especially in mononuclear cells. Some of the parasites have rod-shaped, others spherical blepharoplasts, and large forms with curved blepharoplasts were observed. Besides these, coccoid bodies, resembling large gonococci, and wedge-shaped or pear-shaped nucleated cells staining a light rose pink (plasma cells), were found in some of the tumours. The history of a second case points to the affection being contagious, the contagion being conveyed by bed-bugs, or possibly by *Phlebotomus sp.* The disease apparently lasts for years.

L. Bousfield,[9] in an investigation which was necessarily very restricted, has gathered forty-two cases of kala-azar in the Sudan, and at least fifteen of these on the Blue Nile. It is interesting to note that in the spleen of a dog belonging to a patient suffering from acute kala-azar, parasites (*Leishmania sp.*) were found. In the spleen of a patient, a suspected case of kala-azar, the author figures some curious looking parasites which resemble hæmogregarines. Their size was 3 to 5 μ long by 0·5 μ broad, though some are figured twice this length.

N. Faichnie and J. H. R. Bond[10] record the cure of a case diagnosed as kala-azar, by the administration of **Tinct. of Senega** in ½-dr. doses three times a day. Whatever the disease was, the favourable results of the treatment were undoubted.

REFERENCES.—[1]*Ind. Med. Gaz.* Dec. 1909; [2]*Jour. R.A.M.C* Feb. 1910; [3]*Ibid.* June, 1910; [4]*Lancet*, Nov. 20, 1909; [5]*Brit. Med. Jour.* Jan. 15, 1910; [6]*Ibid.* Feb. 26, 1910; [7]*Ibid.* Nov. 6, 1909; [8]*Jour. R.A.M.C.* Jan. 1910; [9]*Ibid.* Aug. 1910; [10]*Ibid.*

LEPROSY. *J. W. W. Stephens, M.D.*

Rodrigues,[1] who has treated twenty-three cases of leprosy with **Nastin,** states that the improvement shown is very slow, and sometimes nil. In some cases improvement took place after a dozen injections or so, but the cases then remained stationary.

T. Jackson[2] treated nine cases with **Nastin B** (a solution of nastin in benzoylchloride of about 1–30). After fourteen weeks' trial, the author considers the treatment encouraging, as it is the only one which offers any hope of cure or amelioration. Similarly, F. Raschid[3] reports decided improvement in three cases.

J. A. Thompson[4] states that in his hands nastin has proved to be an entirely inert body, save for some local irritant effects. Finally, the *Lancet*[5] reviews an account given by G. B. Messum in the *Transvaal Medical Journal*, of the treatment of twenty cases. The duration of the treatment varied from six months to a year and a half, but no decided or definite action could be attributed to it. It is evident that the evidence is conflicting, and we must await the result of carefully conducted experiments on a large scale. (See also *page* 41.)

Wassermann Reaction in Leprosy.—H. Fox[6] has applied the Wassermann and Noguchi tests to 15 cases, and the Noguchi test to 45 cases of leprosy. In 38 cases of the tubercular and mixed type, the reaction

was positive in 7, weakly positive in 3, positive in 21, and strongly positive in 7 cases. Of 22 maculo-anæsthetic and pure anæsthetic cases, the reaction was negative in 19, strongly positive in 1, and positive in 2 cases. (For Wassermann's reaction, see *Medical Annual*, 1910. In the Noguchi reaction, human corpuscles are used instead of sheep's.) In this case the antigen was acetone insoluble lipoids, and the patient's serum was used in the " active " condition.

REFERENCES.—[1]*Ind. Med. Rec.* Dec. 1909; [2]*Therap.* Dec. 15, 1909; [3]*Brit. Med. Jour.* Nov. 1909; [4]*Ibid.* Mar 5, 1910; [5]*Lancet*, July 30, 1910; [6]*Amer. Jour. Med. Sci.* May, 1910.

LEUCOCYTHÆMIA.

George Lovell Gulland, M.D.
Alexander Goodall, M.D.

Although a permanent cure is hardly to be expected, the application of **X-rays** generally acts beneficially as a palliative. Hayes[1] recommends the mapping out of the superficial area of the enlarged spleen into several areas, and irradiating each space in turn at short intervals. The spleen can thus be exposed to the *x*-rays from several angles, while the skin in any one part only gets a fractional amount of the entire irradiation. Radiotherapy is more costly, is not dangerous, and the response to it is rapid. Relief from the distressing symptoms is obtained early, but the outlook as regards absolute cure is still gloomy.

REFERENCE.—[1]*Dub. Med. Jour.* May, 1910.

LEUCOPLAKIA.

Radium in (*page* 89).

LICHEN PLANUS SCLEROSUS ET ATROPHICUS.

E. Graham Little, M.D., F.R.C.P.

Ormsby[1] reviews the literature of this obscure affection and contributes a report of five new cases. The disease is characterized by an eruption of polygonal flat-topped white ivory-like papules carrying horny plugs, usually distributed on the upper part of the trunk, back and front, the neck, axillæ, and forearms. Women are more often affected than men, generally between the ages of thirty and sixty, and of nervous type. The white lesion is often the terminal stage of the disease which commences with horny comedo-like plugs situated at the orifice of the pilosebaceous or sweat ducts. Ormsby has, however, seen the initial papules white, with a dark spine or pit; this, when it involutes, leaves a white soft atrophic area of the size and shape of the primary lesion. Itching is generally present. Histologically, as first noted by Darier, and confirmed by later observers, the most important feature is a sclerosis of the papillary and subpapillary layers of the corium, a feature which distinguishes it from lichen planus. The confusion most likely to arise is with the so-called " white-spot disease," which is probably circumscribed scleroderma; in the latter, however, there are no initial papules with dark horny plugs. The disease is probably a special form of lichen planus. **X-rays** afford the best treatment.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Sept. 10, 1910.

LIP, TUBERCULOSIS OF. *Priestley Leech, M.D., F.R.C.S.*

Armstrong,[1] of Montreal, reports a case of tuberculous ulcer of the lip in a man, aged fifty-three. It first began with a small red spot midway between the centre and the angle of the mouth on the left side; it was not painful, and gradually became covered with a dry heaped-up scale. The patient frequently pulled the scab off, when the surface beneath appeared red but did not bleed. On admission there was an ulcerated area 1½ cm. (⅝ in.) in length and 1 cm. (⅜ in.) in width. It was as much on the cutaneous as on the mucous surface; the edges were thickened and somewhat elevated, but not undermined; the base was only very slightly indurated, of a pale yellowish colour, and dry. For a short distance round the edge of the ulcer the skin and mucous membrane were reddened and slightly infiltrated. There was an enlarged gland in the submaxillary region and one in the submental region. There were signs of phthisis at both apices. Tuberculous ulceration of the lip is very rare, and may be in the form of a solitary ulcer as in this case, or ulcerated areas that are secondary to, and invasions from, the mucous membrane of the buccal cavity, or related to tuberculous diseases of the adjoining skin of the face, as sometimes occurs in lupus. It should be suspected when the ulcer presents a soft base, with but little evidence of induration or infiltration, and especially when there are evidences of tuberculosis elsewhere. A diagnosis cannot be arrived at without a microscopical examination.

REFERENCE.—[1]*Ann. Surg.* Ap. 1910.

LUNG, GANGRENE OF.

Eucalyptol-Menthol by injection (*page* 28).

LUNG, PUNCTURE OF. *Joseph J. Perkins, M.B., F.R.C.P.*

Horder[1] has suggested puncture of the lung by means of a sterilized needle as a means of obtaining material for culture in cases of doubtful disease, and has reported some examples of the practice. The method is undoubtedly useful, and, should the circumstances warrant, permissible, but one must not be blind to the dangers accompanying it. These dangers are invasion of the pleura and chest wall by infective material, and, as A. E. Russell[2] has pointed out, sudden death, an event which has not infrequently followed puncture, being due to cardiac inhibition from stimulation of the pulmonary fibres of the vagus. The use of the projected method must therefore evidently be restricted to cases in which information to be gained from puncture is imperative, and to be gained from puncture alone.

REFERENCES.—[1]*Lancet*, Nov. 6, 1909; [2]*Ibid*, Nov. 20, 1909.

LUPUS.

Static Electricity in (*page* 96).

LUPUS ERYTHEMATOSUS.

(*Vol.* 1910, *p.* 433)—Internally, **Salicin** and **Quinine** are of most use, also **Ichthyol** gr. v t.d.s. Locally, **Hebra's Soap Liniment** or soft soap itself serves for removal of scales; while hyperæmia is reduced by application of ichthyol, adrenalin, or formalin. **Ionization** and **Carbon Dioxide Snow** have of late proved admirable forms of local treatment.

LYMPHANGIOPLASTY. *Priestley Leech, M.D., F.R.C.S.*

Several papers on this subject have appeared during the year. Mitchell,[1] of Belfast, reports two cases of solid œdema following erysipelas of the face, in which he used sterile silk threads in the subcutaneous tissue as suggested by Sampson Handley; the results in both cases were good. Captain Scott, I.M.S.,[2] treated three cases of elephantiasis of the scrotum by this method; there was some improvement, but the results were not encouraging.

Sampson Handley[3] in the Hunterian Lectures on the Surgery of the Lymphatic System, describes in detail the operation which he has perfected for the relief of swollen arm in cancer of the breast, as noticed in the *Medical Annual*.[4] There have been various opinions as to the exact pathology of the brawny arm in breast cancer; but its onset is determined by the blocking, not merely of the main lymphatic trunks, but also of all the collateral routes about the shoulder by which the lymph could find a passage. The pathology of brawny arm is a corollary to the permeation theory. Permeation spreads from the breast in an ever-widening circle, and must ultimately envelop the shoulder; perilymphatic fibrosis follows, and the lymphatic circulation of the arm is thus cut off from the general lymphatic circulation, from the conversion of the lymphatics into fibrous cords. Other factors aiding the increase of the dropsy are a watery state of the blood, and the pressure of the dropsy on the capillaries tending to cause venous obstruction, and thus increasing the dropsy.

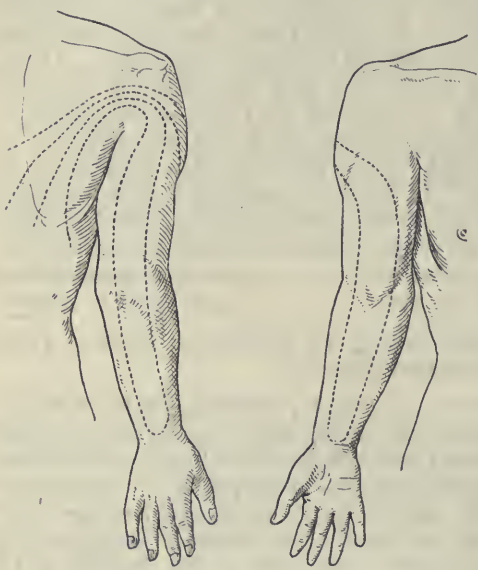

Fig. 45.—Showing the course of the threads in Lymphangioplasty for brawny arm.

The operation of placing the threads in the arm is done as follows: Take a double line of No. 12 tubular sterilized silk, rather more than twice as long as the arm, and mark its mid-point by clipping it with a pair of artery forceps. Wrap up half its length in sterilized gauze. Thread the two free ends of the other half through the eye of a long probe. Make an incision half an inch long through the skin at the middle of the front of the forearm just above the wrist joint; thrust the probe in the desired line (*Fig.* 45) upwards in the

subcutaneous tissues, well away from the skin towards the region of the elbow as high as is convenient, and cut down upon its point. Withdraw the probe through the incision last made, and draw the silk after it as far as it will come. Introduce the probe through the incision from which it has just emerged, thrust it upwards again in the selected line, and repeat the foregoing steps until the point selected for the convergence of the threads is reached. The other half of the silk loop is now led upwards in the selected line along the other border of the flexor surface. The limb is turned over, and the extensor loop of silk is similarly introduced. The tissues of the arm are thus drained by two long U-shaped lines of silk; one draining the front of the arm, the other the back; the bend of the U in each case lying immediately above the wrist, and its limbs occupying respectively the radial and ulnar side of the limb. The two lines of thread meet at a point near the posterior edge of the deltoid (this is well seen in the illustration). There are thus eight free ends of silk hanging out from the incision of convergence at the posterior border of the deltoid. Two at a time these are tucked away in various directions in the subcutaneous tissues of the back by the following manœuvre. Clip a pair of forceps on the selected two threads just where they emerge from the topmost incision; take a long probe, cut off the ends of the thread, so that they are 4 inches shorter than the probe, and thread them into the eye of the probe. Thrust the probe downwards from the incision into the subcutaneous tissues of the back until the probe unthreads itself. Withdraw the probe carefully, leaving the two silk threads to occupy its track. When all the threads have been thus tucked away, the operation is completed by securing the incisions with horsehair.

The great difficulty is to maintain the silk in an aseptic condition; Handley thinks the use of masks is essential, and the silk ends not in use must be wrapped in sterile gauze. If necessary, later, the silk threads can be withdrawn by opening the incisions above the wrist. The results have been very good in suitable cases. Great care must be exercised where there is any ulceration, for fear of contaminating the silk ligatures. The operation should be reserved for the severer degrees of lymphstasis in which other modes of treatment are powerless. It is contraindicated in cases where a general anæsthetic cannot be borne, or where the silk threads would have to pass through cancerous tissue; it is also inadvisable to operate where there is growth present about the shoulder, or if the pain is mainly an axillary one or is a lancinating pain shooting down the arm. In the presence of pleural effusion or secondary growths the benefits of the operation are transient, but the shortest period of relief may be considered by the patient as worth having. Notes and details of the cases are appended. He has tried this method[5] in elephantiasis of the leg, and in solid œdema of the leg, but the results have not been good. He suggests that a micro-organism (a staphylococcus) may play a prominant part in the causation of elephantiasis.

References.—[1]*Brit. Med. Jour.* Nov. 20, 1909; [2]*Ind. Med. Gaz.* Ap. 1910; [3]*Brit. Med. Jour.* Ap. 9, 1910; [4]*Med. Ann.* 1909, p. 413; [5]*Brit. Med. Jour.* Ap. 16, 1910.

MALARIA. *J. W. W. Stephens, M.D.*

S. S. Cohen[1] urges the superiority of **Quinine and Urea Hydrochloride** over other quinine preparations in the treatment of acute chronic malaria. He draws attention to the fact that after a single injection of 1 gram in fever of various types, there is a fever-free period of either six and a half days or thirteen days about, and further calls attention to the similarity between these periods and those of cyst formation and sporozoite formation respectively in the mosquito. As to the injection of this salt, the author recommends deep injection, but not necessarily into the muscle. The syringe should be emptied before withdrawal, so that no drop of the solution falls on the skin ; in that case no accidents occur. A further use is made of these fever-free periods following injection, viz., for diagnostic purposes—if an unknown fever is not followed by this result it may be concluded it is not malaria. Finally, if a dose of the drug insufficient to cause a fever-free period be injected, parasites may appear in cases which previously showed none.

L. E. Ashley-Emile[2] advocates the use of hypodermic injections of quinine in those who have established a tolerance to the drug by excessive daily usage, and in severe cases, such as those characterized by excessive vomiting and pronounced nervous symptoms, especially coma, the intramuscular method is employed; but in order to avoid abscesses or other dangerous sequelæ, strict precautions must be taken. The hands are carefully washed several times with warm water and biniodide soap, and finally in sublimate (1–1000) and sublimate alcohol. The skin is also washed, and rubbed with Scrubb's cloudy ammonia until all dirt is removed, then with 1–20 carbolic, finally with absolute alcohol. Syringes, test-tubes, etc., are washed in warm water, and kept in 1–20 carbolic. The quinine hydrochloride solution 5 gr. is boiled once or twice in a test-tube. The injection is made into the muscle by pinching it up. The seat of puncture is painted with liniment of iodine, and a pad soaked in alcohol subsequently applied. The best muscles to use are the deltoid or interscapular. If the solution is not injected warm, a drop or two of hydrochloric acid is added, producing a clear solution.

J. B. Anderson[3] considers that there is only one way of combating malaria among British and other troops, and that is by the use of the mosquito net.

S. T. Darling[4] has established that the following anophelines transmit malaria in the Panama Canal Zone: *Cellia altimana*, the most important carrier ; *A. pseudopunctipennis* and *A. tarsimaculatus* are less important.

R. Fleckseder[5] has used **Enesol** in the treatment of malaria, and finds that prolonged administration of it completely checks relapses. On the contrary, "606," while checking the attacks and destroying parasites extensively, was followed by a relapse.

Blackwater Fever.—P. F. Foran[6] describes what he considers to be the parasite of blackwater fever, and states that he has also found it in many natives, generally young children ; also in Europeans. The

author considers that the parasite is a piroplasma. [The forms described by the author suggest the fragmentation and flagellation of red cells commonly seen in the tropics in anæmic blood with rich malarial infections.—J. W. W. S.]

P. A. Nightingale[7] considers that the types of blackwater fever that he has observed in Siam, Southern Rhodesia, and the West Coast of Africa are very different. The author gives his experience of cases in Southern Rhodesia. The urine may be black from the first, or within a few hours pass through the claret and coffee-coloured stages. Coffee-coloured urine in a patient who has had much malaria is a sure sign for stopping all quinine. The patient should not be fed until about forty-eight hours after the urine has become normal. The slightest addition to the diet scale may precipitate a relapse. Other conditions being favourable, a good prognosis can be given, provided thirty ounces of clear urine free from albumin are passed in twenty-four hours.

Treatment.—The diet must be strictly **Barley-water** for twenty-four hours, or for longer if possible; if not, milk and soda, or milk and barley-water. This diet should be strictly maintained for forty-eight hours. The more liquid the patient takes the better. Heart failure must be treated with champagne and hypodermic injections of **Strychnine and Digitalin,** often in heroic doses. Vomiting is treated by large mustard poultices enveloping the liver and stomach, and **Calomel,** ½ to 1 gr., is administered every half-hour till 5 or 6 gr. have been given. To relieve lumbar pain, hot **Fomentations** are given; to promote diuresis, **Citrate of Potash,** ½ to 1 dr. every six hours, with large saline rectal enemata. The following routine method of treatment is strongly recommended, though others have found it of no avail: **Bicarbonate of Soda** 10 gr., with **Liq. Hydrarg. Perchlor.** 30 min., every two hours for the first twenty-four hours, and then every three hours until the urine clears. At the same time a solution containing **Methylarsonate of Soda** 1 gr. is taken thrice daily until the temperature comes down to normal for twenty-four hours. In cases of vomiting the drug should be given hypodermically. During convalescence **Warburg's Tincture** should be given in tabloid form. Quinine is likely to induce a relapse, though it was not found to do so in the cases treated in Siam by the author. Cases are mentioned where quinine was given secretly to the patient against his wishes, with the result that blackwater was produced.

Grimm[8] suggests the use of **Cholestearin** in the treatment of blackwater fever. This body has the property of preventing the hæmolytic action of various substances on blood corpuscles. The author has only been able so far to try it in one case, so it is impossible to say at present what its value may be. Given in doses up to 3 grams it produces no injurious effect. The powder is best given by rubbing up with some condensed milk, then adding tea to it. It is then gradually drunk.

References.—[1]*Amer. Jour. Med. Sci.* Sept. 1908; [2]*S. Afric. Med. Rec.*; [3]*Jour. R.A.M.C.* Jan. 1910; [4]*Jour. Amer. Med. Assoc.* Dec. 1909; [5]*Wien. klin. Woch.* Sept. 8, 1910; [6]*Jour. Trop. Med. and Hyg.* July 1, 1910; [7]*S. Afric. Med. Rec.* Sept. 1909; [8]*Deut. med. Woch.* Jan. 27, 1910.

MALNUTRITION.

Sea-water Plasma in (*page* 51).

MALTA FEVER.

Vaccine treatment of (*page* 60).

MAMMARY ABSCESS. (*See* BREAST ABSCESS.)

MARASMUS, INFANTILE. *Prof. G. F. Still, M.D.*

It is open to question whether infantile marasmus can be regarded as ever constituting a disease. It is rather a symptom, which on the one hand may be due to such conditions as congenital syphilis or congenital heart disease, or, on the other hand, may be the indication of some failure of the digestive organs, usually the result of faulty feeding. The cause of the digestive difficulty is often very difficult to ascertain. Talbot[1] considers that it is possible to distinguish between fat-indigestion and casein-indigestion by discriminating between different kinds of curd in the stools. He describes two varieties: (1) Large tough curds, which are usually round or oval, do not easily become smoothed out on the napkin, and if put in cold water and shaken up, quickly sink. These curds consist of a network of casein entangling a certain amount of fat globules in its meshes; if these curds are placed in 10 per cent formalin for four to six hours they become very hard, whereas a fat curd remains soft. (2) Small soft curds, which are seen as either flat white flakes or pin-head elevations, are associated always with more or less green or yellow mucus, are easily smoothed out on the napkin, and tend to be held in suspension when shaken up with water. These are composed mainly of fat in the form of fatty acids and soaps. The predominance of either of these two varieties of curd will point respectively to casein- or to fat-indigestion, and the composition of the milk-mixture must be altered accordingly. Talbot points out that either variety of curd may be of no practical significance if, notwithstanding its presence, the infant is thriving.

Tint and Breskman[2] have examined the contents of the stomach one to two and a half hours after feeding in infants suffering from marasmus, and in others not so affected. They found that whereas in the healthy there were always present free hydrochloric acid, rennin, and pepsin, in those who were suffering with green stools and vomiting and marasmus all these were almost invariably absent. They point out that with marasmus there is almost always this derangement of the gastric secretions.

TREATMENT.—Simpson,[3] whilst pointing out that many cases of marasmus improve with simple modification of the feeding, states that the administration of **Thyroid** has a beneficial effect in some, and that combined with suitable alteration of the diet it gave excellent results. The dosage he recommends is, for infants under nine months, thyroideum siccum, $\frac{1}{3}$ gr. once daily, in older children, up to 1 gr. daily, according to the age of the child. Diarrhœa is apt to occur if larger doses are given; a bright punctiform rash, mostly on the body, and lasting

twelve to twenty-four hours, was observed in several cases. Even where the marasmus was associated with congenital syphilis, thyroid seemed to be of value when given in addition to the necessary mercurial treatment. The particular diet which seemed to be most beneficial when thyroid was being given was a milk and cream mixture with sodium citrate, 1 to 2 gr. in each ounce.

For the suggested employment of ascitic fluid, see *page* 19.

Langmead[4] advocates the use of **Undiluted Milk** to which sodium citrate is added in the proportion of 2 gr. to the ounce. The great advantage of this method is simplicity; all that is necessary is to boil the milk, and add one teaspoonful of the solution of sodium citrate. It was found in many cases that infants digested this undiluted milk better than the diluted. The necessity for addition of cream, which in cities is liable to contain preservatives, and may thus affect the baby injuriously, apart from its expense and frequent bacterial contamination, is thus avoided altogether; as a minor advantage, Langmead notes that micturition is less frequent when undiluted milk is given than when babies are fed on diluted milk.

Milk Albumin in the form of a dry salt of albumin, is sold under the name of albulactin, and according to Bickel and Roeder[5] is of value in the treatment of the wasting due to gastro-intestinal disorders in infancy. The salt is soluble, and is given as an addition to an ordinary mixture of milk and water; for instance, to an infant of about two months, a mixture of milk one part and rice-water two parts was given, and to each feed about 7 gr. of albulactin were added.

Soybean is recommended by Ruhräh[6] for marasmus in infancy. This bean is free from starch, and contains a high proportion of protein; a flour prepared from it showed 44·6 per cent of proteid and 19·4 per cent of fat. For the feeding of infants a thin gruel is made, containing 1 to 2 level tablespoonfuls of the flour to a quart of water, and this is used as diluent, in a weak milk-mixture, according to the needs of the infant; or the gruel may be made stronger (4 level tablespoonfuls to the quart), so as to contain 1·4 per cent of proteid. The flour is to be boiled for fifteen minutes, and the resulting gruel to be made up to the quart after boiling is ended. The addition of one or two teaspoonfuls of barley-flour will prevent the formation of a sediment in it, but this addition will introduce about 1 per cent of starch.

It may be doubted whether any vegetable proteid can advantageously replace milk-proteid as a rule in infant feeding. According to La Fetra,[7] the order of digestibility of the various proteids is as follows: breast-milk, cow's milk, eggs, meat, vegetable. The proteid of breast-milk requires the smallest amount of gastric juice; the vegetable proteids take the longest time for digestion, and are least well absorbed in the intestine.

References.—[1]*Bost. Med. and Surg. Jour.* Feb. 3, 1910; [2]*N.Y. Med. Jour.* Jan. 18, 1910; [3]*Brit. Med. Jour.* Ap. 30, 1910; [4]*Med. Press*, July 13, 1910; [5]*Ibid.* May 4, 1910; [6]*Jour. Amer. Med. Assoc.* May 21, 1910; [7]*N.Y. Med. Jour.* Nov. 27, 1909.

MASTITIS. (*See* BREAST, INFLAMMATION OF.)

MASTOID PROCESS, DISEASES OF. (*See* EAR, DISEASES OF.)

MEDIASTINAL TUMOURS. *Joseph J. Perkins, M.B., F.R.C.P.*

Herringham[1] reports a most interesting case of great improvement under treatment in a man with marked signs of an intrathoracic tumour. In addition to internal signs, there were œdema of the chest wall, with a broad band of dilated superficial veins, large masses of glands in the posterior triangle of the neck on either side, and smaller masses in the axillæ, with glands in the groin. He was placed on **Arsenic** and treated by the **X-rays.** At the beginning of treatment he was extremely dyspnœic and was suffering greatly ; a fortnight later he was quite comfortable. The axillary glands and those in the neck shrunk until they were hardly visible, while the œdema of the chest wall and the dilated veins disappeared. So remarkable was the improvement that Herringham concluded the case to be one of lymphadenoma and not of lymphosarcoma ; unfortunately a post-mortem some months later showed the latter, his first diagnosis, to be correct (see *page* 80). He has some very instructive remarks on the difficulty, indeed, occasionally impossibility, of discriminating between the two. A blood-count may help, for a marked lymphocytosis excludes lymphadenoma—a polymorphonuclear leucocytosis may be found in either.

Fever, especially if the febrile periods occur in regular succession and are separated by apyrexial intervals, argues strongly for lymphadenoma, fever in sarcoma being exceptional. As a lesson in treatment the reported case is most encouraging.

Bosanquet[2] draws attention to the very interesting symptoms which may attend **Dermoid** tumours of the mediastinum. Though present at birth, they have a tendency to take on activity at the age of puberty, irritating the lung and surrounding structures, to which they ultimately become bound by dense adhesions. The one pathognomonic feature of a mediastinal dermoid is the expectoration of hairs, a symptom which might excite a suspicion of malingering, especially as their colour need not conform to those growing on the patient elsewhere. Though in the main their symptoms are those of other mediastinal tumours, there are points of difference : expectoration is profuse and purulent, while there is marked bulging and deformity of the chest wall, due to the presence of the dermoid at an early age while the ribs and cartilages are still soft.

Da Costa[3] calls attention to the value of **Percussion of the Spinal Column** in demonstrating the presence of mediastinal lesions. Resonance varying in degree may be obtained along the whole length of the spinal column ; but for practical diagnosis the value of the method, he considers, is confined to percussion of the thoracic vertebræ. The patient's posture must be such as completely to relax the vertebral muscles and the interspinous ligaments, i.e., he must be seated with the trunk and head inclined forwards, the crossed arms resting lightly on the knees. The percussion is done in the

ordinary mediate fashion, the plexímeter finger being applied to the tips of the spinous processes, one by one; percussion must be gentle, but only experience can teach the exact degree of force required to bring out the correct note. Disease or rigidity of the spinal column of course renders the method inoperative. Carried out in the manner described, percussion of the thoracic spine shows impaired resonance reaching from the first to the third or fourth process, while below down to the twelfth a clear osteal note is present.

Details of twenty cases are appended, showing variations of these conditions or their boundaries in enlargement, e.g., malignant or tuberculous, of the posterior mediastinal glands. For instance, in a case of malignant disease marked dullness was present from the first to the eighth thoracic spine. In only a single instance were the findings, tested by *x*-ray examination, at fault.

The method is one which will be found of considerable value, especially in the diagnosis of tuberculous mediastinal glands in children.

REFERENCES.—[1]*Clin. Jour.* Oct. 27, 1909; [2]*Ibid.* Dec. 8, 1909; [3]*Amer. Jour. Med. Sci.* Dec. 19, 1909.

MELÆNA NEONATORUM. *Prof. G. F. Still, M.D.*

This extremely fatal affection is still very obscure in its pathology. It is unnecessary to describe its symptoms in detail: they are well-known. An infant within forty-eight hours after birth begins to vomit blood or to pass dark, blood-stained stools; strength is lost very rapidly, profound anæmia occurs, and within a day or two usually the infant dies. As Schwarz and Ottenberg[1] point out, there are other cases, probably similar in pathology, in which there is bleeding from many parts, for instance in the skin, from the mouth, from the navel, from the nose, and perhaps also from the gastro-intestinal tract. To include such cases the term "hæmorrhagic disease of the newborn" is used by some writers. Finkelstein regards the cases with hæmorrhage from several parts as always of bacterial origin, and disbelieves entirely in the syphilitic causation which has been asserted by some. Schwarz and Ottenberg, from observations on two cases of multiple hæmorrhage in infants respectively eleven days and four weeks old, conclude that there is loss or delay of coagulation in the blood in these affections, and that this is probably due to destruction of or interference with the production of thrombokinase by the tissues. Very little is known about this thrombokinase, which is normally present in certain tissues, and plays a part in the formation of clot. A less abstruse pathology is advocated by Schöppler,[2] who holds that ligature of the umbilical cord at birth leads to acute hyperæmia of the stomach and bowel, and that where resistance is for any reason defective, the hyperæmia, together with the further irritation produced by food, leads to inflammation and hæmorrhage.

Welch[3] describes several cases of hæmorrhage in the new-born under the term "hæmophilia" neonatorum, a name which seems singularly unsuitable even for his particular cases, in none of which could any

family history of hæmophilia be obtained ; it is generally agreed that whatever may be the pathology of hæmorrhage in the new-born, it is almost never due to hæmophilia, and in the few cases in which it is hæmophilic it is likely to occur only as a result of traumatism, for instance, on separation of the cord, as at any other age.

TREATMENT.—Welch (loc. cit.) states that in **Normal Human Serum** we find an agent that successfully controls hæmorrhage in the new-born, and he has reason to believe that even where the hæmorrhage is due to bacterial infection this serum treatment will still be effective. The serum was administered subcutaneously in doses of 5 to 9 cc. twice or thrice daily, until about 60 to 120 cc., according to the effect produced on the hæmorrhage, had been administered. He describes the apparatus for collecting the blood to obtain the serum, but he does not mention the source from which the blood is to be obtained. A more practicable suggestion is that of Bigelow,[4] who used **Rabbit Serum** in three cases ; 5 cc. were injected subcutaneously ; in two of these only one dose was given, in one two doses ; all recovered. The serum used was fresh, and was injected immediately after obtaining it from the rabbit.

Mosenthal[5] describes a case in which direct **Transfusion** from father to child was done successfully, by end-to-end anastomosis of the baby's femoral vein to the radial artery of the father ; he states that transfusion "is indicated in every instance of the disease, as it is the only method of cure known." The two methods mentioned above have been published since this statement, and are obviously much safer and in every way more practicable. But it is by no means certain that other methods are useless : there is considerable testimony in favour of **Gelatin.** Engelmann[6] reports recovery after subcutaneous injection of gelatin, 10 cc. being used at each injection, and two of these being administered ; he states that since 1903 43 cases have been treated with gelatin injections, of which 40 recovered. Admittedly, however, there are risks from this treatment, one being the supervention of tetanus ; but this, Engelmann says, is avoided by using Merck's specially prepared gelatin. If, therefore, the *oral administration of gelatin* is successful, as Machell and others have claimed, it is certainly much to be preferred. The solution used for oral administration is :—

℞	Gelatin	gr. xxx	Distilled Water		ʒiij
	Sodium Chloride	gr. ij			

One drachm to be given every hour.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* July, 1910 ; [2]*Centr. f. allg. Pathol.* Ap. 15, 1910, in *Lancet* May 7, 1910 ; [3]*Amer. Jour. Med. Sci.* June, 1910 ; [4]*Jour. Amer. Med. Assoc.* July 30, 1910 ; [5]*Ibid.* May 14, 1910 ; [6]*Deut. med. Woch.* June 16, 1910.

MELANCHOLIA.

Bedford Pierce, M.D.
Norah Kemp, M.B., C.M.

Bedford Pierce[1] discusses the diagnosis in states of depression, having analyzed for this purpose two hundred consecutive cases. Alcoholism and drug habit having been excluded, the importance of a careful

examination of the nervous system is dwelt upon, in order that the possibility of general paralysis of the insane should not be overlooked. He next discusses the special features of dementia præcox, especially emphasizing the way in which the mental faculties are unequally attacked in this disorder; there may be no failure of perception or memory, but there is generally a strange emotional indifference, with uncertain conduct, impulsiveness, unexplained refusal of food, obstinate silence, or strange attitudes or grimaces. In dementia præcox, waves of depression are common, but they are rarely accompanied by any true emotion, and when suicidal attempts are made the patient seems unable to explain or in any way justify his attempt, and they seem to be devoid of motive.

Psychasthenic states are discussed at some length, and it is pointed out that the depression in these is secondary to the mental condition. Some imperative idea or obsession distresses the patient that the daily work cannot be done. The condition is aggravated in many cases by the fear of going mad. The patient naturally becomes very miserable, but this is not a primary state of unhappiness and gloom. Only rarely, in his experience, do such patients commit suicide.

Melancholia is divided into four divisions: (1) *Confusional*; (2) *Inhibitory*; (3) *Intrinsic*; (4) *Involutional.*

1. The *confusional* group is considered a part of acute confusional insanity, in which there is disorientation, lack of memory of incidents during the illness, with sudden impulsive suicidal acts. Many cases of puerperal insanity fall into this group. The prognosis is relatively good.

2. The *inhibitory* group forms part of Kraepelin's manic-depressive insanity; and the chief features are slowness of thought, delayed response to questions, deficient peristalsis, and constipation. In extreme cases a condition of stupor occurs. Such patients are usually suicidal. Hallucinations are rare, delusions common. The family history is usually bad. The prognosis is good as regards the attack, but relapses are to be expected.

3. In the *intrinsic* group are placed cases of pure depression, without confusion, or slowness of ideation, while the patients can give a lucid account of their mental suffering. Such patients are usually intelligent, and when disposed towards self-destruction frequently succeed in ending their life.

4. The *involutional* group, as the name implies, includes most persons who become depressed in their declining years, the commonest symptoms being apprehensiveness, anxiety, and fear of impending calamity. Many patients believe they are destitute.

The classification adopted closely follows that of most modern authors, except for the separate heading "intrinsic" melancholia, which B. Pierce considers independent of manic-depressive insanity and the melancholia of involution. The value of examination of the blood in the diagnosis of melancholic states is emphasized, and he says there is a marked increase of leucocytes in the group described

as confusional. It should be explained that eighteen out of the two hundred cases reviewed did not fall into either of the above-mentioned divisions; some of these were cases of depression due to definite organic disease; but others, on account of their peculiar features, were left unclassified.

REFERENCE.—[1]*Brit. Med. Jour.* June 4, 1910.

MEMBRANA TYMPANI, DISEASES OF. (*See* EAR, DISEASES OF.)

MENINGITIS, OTITIC. (*See* EAR, DISEASES OF.)

MENOPAUSE.

Ovaradentriferrin in (*page* 42).

MENTAL DISEASES, GENERAL THERAPEUTICS OF. (*See also Special Articles.*)

Bedford Pierce, M.D.
Norah Kemp, M.B., C.M.

Dr. Edwin Goodall and Mr. R. L. Mackenzie Wallis, B.A.,[1] give an account of the use of electric baths in the treatment of the insane, with special reference to the influence such treatment has upon metabolism, as shown by the excretion of creatinine. The sinusoidal current was used. Each bath lasted twenty minutes, and the patient had a course of eighteen or twenty baths; 108 patients were treated in this way, and 62 of them recovered or showed mental improvement, and as they improved they gained weight. They were mostly cases of melancholia. Sixteen control cases were treated with warm baths at the same temperature, under the same conditions, and in the same number; of these 10 gained weight, but only 2 improved, 1 of whom recovered; the other 14 remained unchanged. In estimating the amount of creatinine excreted, the colorimetric method devised by Folie in 1904 was used. The excretion of creatinine was observed for at least three days before beginning the baths, and except in one case, was increased as a result of the electric-bath treatment. After the baths were stopped, the excretion of creatinine diminished. The effect of the warm baths was to lower or increase the creatinine only to a slight extent.

Wallis points out that, according to Schaffer, "creatinine is an index of a special process of metabolism taking place in the muscles, and that the muscular efficiency depends upon it. Exposure of the muscles to a sinusoidal current probably intensifies this process, increasing the general tone of the muscles, and in consequence creatinine metabolism."

George Porter Phillips[2] gives a detailed account of the treatment of melancholia by the lactic-acid bacillus (melancholia being attended by considerable digestive disturbance, this form of treatment was considered likely to be successful). The strain used was the long bacillus of Massol, and it was given in the form of soured milk, ½ pint twice daily. The patient's diet was regulated. For the first two days, only milk, malt extract, and sugar of milk solution were given, followed by gruel, milk puddings, custard, bread and butter, biscuits.

From three to seven days after, yolks of eggs, milk, cream, bread and butter, potatoes, milk puddings, fruit, and vegetables were added, meat and all soups and gravy being avoided. These foods were considered to provide less favourable soil for the growth of proteolytic organisms, and more favourable to that of the lactic-acid bacillus. It was noted that at first constipation was aggravated, then tended to decrease. The tongue cleaned, the complexion improved, and the patient enjoyed his food better and gained in weight. Phillips states that in such cases this form of treatment shortens the duration of the illness and increases the percentage of recoveries from 46 to 61.

REFERENCES.—[1]*Jour. Ment. Sci.* Ap. 1910; [2]*Ibid.* July, 1910.

METEORISM.

Carbenzyme Trypsin in (*page* 23).

MIKULICZ'S DISEASE (Symmetrical Lymphomata of the Lacrymal and Salivary Glands).

Robt. Hutchison, M.D.

Ziegler[1] has published two examples of this rare disease, with a full bibliography of its literature. The condition, which was first described by Mikulicz in 1888, consists in a chronic, non-inflammatory, symmetrical enlargement of the lacrymal and salivary glands, unassociated with any demonstrable systemic disease.

SYMPTOMATOLOGY.—The objective symptoms are chiefly a dense, brawny swelling of the glands involved, non-painful, but sometimes tender to pressure, freely movable under the skin, but occasionally adherent to the subjacent tissues. The facial appearance is quite characteristic. There is a marked broadening of the cheeks as in mumps, and partial ptosis on the temporal side, the drooping eyelids resembling those of a bloodhound. Elevation of the lid at the external canthus often reveals a downward displacement of the retrotarsal fold by the swollen and pendulous lacrymal gland. Both parotid regions are occupied by a broad, oval tumour, which may be knobby or lobulated, and frequently displaces the lobe of the ear upwards and outwards. The submaxillaries do not, as a rule, protrude on the skin surface, but may become unduly prominent on the floor of the mouth. The subjective symptoms consist in dryness of the conjunctiva and mouth, and difficulty in swallowing or talking, from the interference caused by the enlarged submaxillaries. Respiratory disturbances are not uncommon. The age at which the

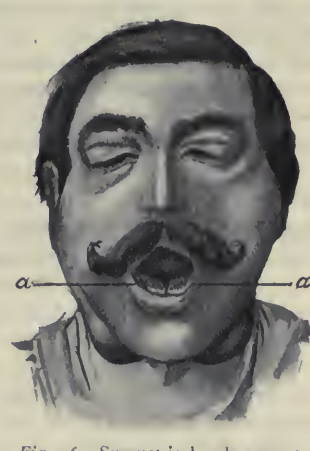

Fig. 46.—Symmetrical enlargement of the lacrymal, parotid, and submaxillary glands. (Original case of Mikulicz.) (*a*, *a*) Sublingual glands.

disease was first manifested ranged from four to seventy years. Males and females appeared to be affected about equally. The duration of the attack varied from two months to ten years and upward, which fact of itself would emphasize the chronic, indolent character of the affection. No constitutional disease has been found complicating these cases, when typical.

Pathologically the enlargement of the glands is found to be due to an infiltration of the connective tissue with small round cells (lymphoma).

The Prognosis is favourable, the disease never proving fatal; but it runs a very chronic course, and relapses are frequent.

Treatment.—**Arsenic,** the **Iodides, Pilocarpine, Thyroid,** and **Roentgen Rays** have all proved useful. Respiratory obstruction must be promptly and thoroughly removed. Extirpation of the tumours is rarely indicated.

Sejournet[2] has also reported a case, and gives a résumé of our knowledge of the condition, with full references to the literature. The following are some of his conclusions: (1) The hypertrophy affects the lymphoid elements normally present in the glands. (2) It is distinguished from other affections of the lacrymal and salivary glands: (*a*) From the syndrome of Frenkel, by the affection of the lacrymals and the presence of lymphadenoid lesions; (*b*) From acute affections, by the chronic course, lasting for years, and by the absence of pain and general symptoms; (*c*) From "pseudo-leukæmia," by the absence of enlargement of the spleen and lymphatic glands; (*d*) From the leukæmias, by the absence of blood-changes. (3) The pathology is obscure, but it is probably due to a chronic infection. (4) The prognosis is good. (5) Treatment consists in the administration of iodides and arsenic. Radiotherapy (*x*-rays) gives good results.

References.—[1]*N.Y. Med. Jour.* Dec. 11, 1909; [2]*Rev. de Chir.* July 10, 1910.

MOLLUSCUM CONTAGIOSUM. *E. Graham Little, M.D., F.R.C.P.*

Knowles[1] reports a new series of cases of this disease in addition to those noted in last year's *Medical Annual.* Ten small "family epidemics" came under his observation; of forty-one children affected, twenty-three were girls and eighteen boys; the number of lesions noted in any one case varied from one to one hundred. Summarizing the literature, Knowles remarks that in 25 per cent of the cases a history of contagion can be elicited. The geographical distribution of this disease seems to vary curiously. Little[2] collected personal and other statistics which showed that the incidence varied very widely in different centres. Norman Walker,[3] commenting on this paper, claims a much larger percentage for Edinburgh than London, and is inclined to ascribe it to the infection by bathing in public. That it is infective may be regarded as practically established, though as yet no direct evidence of the organism concerned is obtainable.

References.—[1]*N.Y. Med. Jour.* May 14, 1910; [2]*Brit. Jour. Derm.* June, 1910; [3]*Ibid.* Sept. 1910.

MORTON'S DISEASE. (*See* ANTERIOR TARSALGIA.)

MULTIPLE SCLEROSIS.

X-ray treatment of (*page* 79).

MUMPS. *E. W. Goodall, M.D.*

Six cases of epigastric pain and vomiting occurring after an attack of mumps, and believed to be due to pancreatitis, are reported (very briefly) by H. P. Godfrey,[1] writing from Melbourne. Similar cases are reported by Reynolds,[2] Penny,[3] Fortescue Fox,[4] and Mabel Russell.[5]

REFERENCES.—[1]*Brit. Med. Jour.* July 23, 1910; [2]*Ibid.* Aug. 6, 1910; [3]*Ibid.*; [4]*Ibid.*; [5]*Ibid.* Aug. 13, 1910.

MYALGIA.

(*Vol.* 1910, *p.* 113)—Muscular pain of various types is often relieved by application of **High-frequency Currents.**

MYELOMA, MULTIPLE. *George Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Hirschfeld[1] analyzes the published cases. The condition is most common between the ages of forty and sixty. Trauma is suggested as an etiological factor in a fair number of the cases.

PATHOLOGY.—The tumours occur either as circumscribed masses or as a diffuse infiltration of the marrow. The latter is the least common. The condition is regarded as an aleukæmic leucocytoma. The actual tumours may be lymphocytoma, myeloblastoma, myelocytoma, plasmacytoma, possibly erythroblastoma with local aggressive development.

DIAGNOSIS.—The diagnosis is easy in typical cases. In atypical cases, at the commencement it may be difficult or impossible. Where there are cachexia and anæmia, severe pain, with deformity and tumour formation, spontaneous fractures, and involvement of the nervous system, the diagnosis is simple. It is quite impossible, however, to distinguish the *exact* nature of the tumour (myeloma, endothelioma, or other form) during life. The occurrence of Bence-Jones albumosuria confirms the diagnosis in clinically typical cases, but in rather more than 50 per cent of cases this symptom is absent. The presence of tumours may be made out by means of the Röntgen rays.

REFERENCE.—[1]*Folia Hæmat.* ix. 1910.

NÆVUS.

Electricity in (*page* 94).

NEPHRITIS. *Francis D. Boyd, M.D.*

ETIOLOGY.—For long it was taught that alcohol and chronic alcoholism were important factors in the causation of chronic nephritis. From the study of 460 cases of chronic alcoholism in private practice and in an inebriate hospital, Hultgen[1] concludes that if chronic alcoholic excess has any deleterious action on the kidneys, we have no means, either clinical or biochemical, by which to detect such changes. Among 461 drinkers, only 42, or 9·1 per cent, showed temporary or permanent albuminuria, while 394 patients, or 85·7 per cent, showed no evidence,

either subjective or objective, of deficient renal function. The author concludes that alcohol taken daily, as it is by chronic inebriates, dipsomaniacs, or drinkers, is not an irritant to the kidneys; that when nephritis occurs in a chronic alcoholic, it is probably due to some other concomitant toxic agent, and not to alcohol. The organs which eliminate alcohol, the lungs and the kidneys, are least affected by alcohol.

TREATMENT.—The therapy of nephritis has during the last few years undergone modifications as the result of fresh physiological and pathological knowledge. The observations of Von Noorden and of Maragliano[2] have shown that dietetic treatment can be varied without danger, indeed with great benefit to the patients; that diet may be more abundant, and that animal protein may be added. One constantly hears about retention of waste products, but Calabrese[3] points out that a long series of observations have shown that the kidney is generally permeable to waste products, be they animal or mineral. One must say generally with intent, for there are occasionally cases where there is suspension of the renal functions, either through obliteration of the circulation or reflexly through the nervous system; but retention is not lasting, and is followed by an excretion superior to the normal.

Langdon Brown[4] urges that it is difficult on theoretical grounds to believe that the albuminuria of nephritis can be influenced by the amount of albumin in the diet, and practically, when the question is investigated in chronic nephritis, the albuminuria is found to be uninfluenced by the addition of three eggs to a diet poor in nitrogen. If the amount of urea excreted be a guide to the capacity of the kidney, the ratio of $\frac{\text{urea nitrogen}}{\text{albumin nitrogen}}$ ought to rise if the patient be getting better, and fall if he be getting worse. But this is by no means the case. The amount of urea excreted in the twenty-four hours gives very little information as to the severity of a case of Bright's disease unless the diet is taken carefully into consideration. Too rigid a limitation of protein in the diet, even in chronic nephritis, with a view to diminishing the albuminuria, is bad, because it cannot effect the desired object, and deprives the patient of an essential form of nourishment. On the other hand, an excessive protein diet is inadvisable, even if the patient can metabolize it, because he is getting nourishment in a form that throws work upon the damaged excretory organs. Chittenden's diet gives us the physiological minimum of protein, but a patient on this diet could not maintain balance, as he is excreting albumin in the urine. He must, therefore, have added to his diet an amount of protein equivalent to the amount of albumin being lost in the urine. A nephritic can excrete 15 grams of nitrogen in the twenty-four hours; but above this elimination becomes irregular and uncertain. Fifteen grams of nitrogen correspond to 94 grams of protein (a little over 3 oz.), and this is the maximum which should be allowed. While avoiding meat extracts and organs such as sweetbreads, which contain a large proportion of purins useless for nutrition and difficult of excretion by the damaged kidney, we must at the same time avoid monotony

of diet, which leads to failure of appetite and nutrition and yet is incapable of affecting the albuminuria.

The cause of œdema in nephritis has received a good deal of attention, and the salt-retention theory has been adversely criticized as being insufficiently supported by clinical evidence. Recent careful clinical studies (Blooker[5]) have failed to show any close relation between salt retention and œdema; and renal cases *without* œdema may show a marked decrease in power to excrete ingested salt. On the other hand, there is increasing evidence to show that peripheral vascular lesions play an important rôle in the production of œdema (Christian[6]). It cannot be claimed that the evidence is so far complete, but experimental work very strongly suggests that œdema in nephritis results from injury to the peripheral vessels associated with changes in the kidney, also for the most part vascular. If we accept this view, there is no difficulty in understanding how there is no strict correspondence of œdema and a definite type of anatomic lesions in the kidney. Treatment would resolve itself into an effort to combat the factors concerned in the causation of the œdema (Rolleston[7]). Toxæmia must be diminished, as toxins circulating in the blood damage the capillary walls and tend to increase œdema. Removal of these toxins may be promoted by free drinking, so as to wash them out of the body. This plan may succeed if the kidneys can deal with the increased amount of fluid; it otherwise will fail. Copious water-drinking may be successful in some cases of chronic nephritis, but should be avoided in acute and subacute nephritis, where the kidneys require as much rest as possible. The use of diuretics in œdema requires very careful consideration, and their effects must be carefully watched, even in selected cases, for it is often bad therapy to stimulate organs which should rather be rested. Hot-air baths often produce benefit by diminishing hydræmia, and possibly by removing toxins. Probably the most satisfactory method of removing toxins and salts from the tissues is by direct drainage by incising the legs, or better still by means of Southey's tubes. The question of restricting the intake of fluid and so avoiding hydræmia is still a matter of debate, and by some has been considered a source of danger. In the œdema of acute nephritis, restriction of fluid seems to give satisfactory results, affording the kidneys much-needed rest. In chronic nephritis, marked differences are manifested in different patients. In some the kidneys are incapable of dealing with more than a restricted amount of fluid, whereas in others they show a capacity to dispose of an increased ingestion of fluid hardly below that of healthy organs, and yet there is œdema. In the first group of cases restricted fluid may be desirable; in the second a restricted fluid regimen is unnecessary and possibly even harmful. Each case must therefore be treated on its own merits, and no hard and fast rule laid down.

References.—[1]*Jour. Amer. Med Assoc.* July 23, 1910; [2]*Sem. Méd.* No. 41, Oct. 1909; [3]*Ibid.*; [4]*Proc. Roy. Soc. Med.* (Therap. Sec.), p. 138; [5]*Deut. Arch. f. klin. Med.* 1909, xcvi. 80; [6]*Jour. Amer. Med. Assoc.* Nov. 1909, p. 1799; [7]*Brit. Med. Jour.* Aug. 1909.

NERVOUS SYSTEM, SURGERY OF.

K. W. Monsarrat, F.R.C.S.

Neuralgia.

At the Medical Society of London, Mr. Jonathan Hutchinson[1] read a paper on trigeminal neuralgia, and reported a series of 31 operations on the Gasserian ganglion; there was no fatality among the series. The most important part of the communication related to the modification of leaving the ophthalmic division intact. This modification was carried out in 26 cases, and by its adoption all eye complications were avoided. The one difficulty of the operation was the hæmorrhage. At the same meeting Dr. W. Harris spoke of the success attending the method of treatment by **Alcohol Injections.** Of 24 cases which he had treated during the last twelve months, 20 had been successful up to the present as regards entire disappearance of the pain. Sir Victor Horsley was in favour of the use of alcohol injections first, and of resection of the ganglion when these failed to give relief. Other speakers agreed with this view.

Poussep[2] reports 48 cases of trigeminal neuralgia treated with alcohol injections. The minimum number of injections necessary were two, the maximum thirteen. In no case was there any serious complication. In 13 cases the author contented himself with superficial injections, with which he always commences. In all the other cases the injections were deep. Relief was obtained, except in 2 cases; in 12 there was return of the pain at the end of a period varying from several months to a year, but almost always new injections put an end to it. Poussep has also treated cases of intercostal neuralgia in the same way, using a solution of 1 per cent stovain in 90 per cent alcohol, the amount used varying from 25 to 100 cgrams. He treated 8 cases of intercostal neuralgia, and 5 of spondylitis deformans, and obtained a satisfactory result.

Patrick[3] reports 75 cases of facial neuralgia treated by deep injections of 85 per cent alcohol, 2 cc. at each sitting. In a total of about 300 injections there was no accident, except sometimes a slight hæmatoma, or a transitory paralysis of the sixth pair. Relief by this method may be expected to last from one to three years, and the author states that re-injection when the pain returns has given good results.

Clark and Taylor[4, 6] report a case of true tic douloureux of the sensory filaments of the facial nerve, in which cure of the pain was effected by physiological **Extirpation of the Geniculate Ganglion.** The operation actually consisted in cutting the seventh nerve, the pars intermedia, and the upper bundle of the eighth nerve on the left side, after opening the posterior cranial fossa. The result was a complete left facial paralysis; some temporary disturbance of the hearing, and disappearance of the characteristic pain. For a time also she had ataxia. The writers justify this destructive operation by stating that to relieve the pain it would have been justifiable to divide every nerve entering the internal auditory meatus. She was a morphinomaniac. (*See also* Electro-therapeutics.)

Facial Paralysis.

There are two new methods of operation to report, having for their object the cosmetic treatment of the facial paralysis deformity. Jianu[4] suggests a myoplastic proceeding by the transplantation of the neighbouring functioning muscle. In his first case he took a muscle flap from the sternomastoid; the free extremity of this flap was sutured to the deep aspect of the integuments of the lip commissure; the result was satisfactory. In the second case which he reports, operated upon by Jonnesco, a curved incision was made around the angle of the jaw, the anterior half of the masseter was detached from the mandible, and its free extremity sutured in the neighbourhood of the lip commissure. After the operation the patient was able to move the angle of the mouth voluntarily. The operation, of course, only remedies the oral part of the deformity.

Mommburg[5] has devised another method of dealing with these cases by slinging the angle of the mouth to the zygoma. He makes two small incisions under local anæsthesia, one at the angle, and one midway between the angle and the centre of the upper lip; a third incision above the upper border of the zygoma. With a bayonet-shaped needle he passes an aluminium-bronze suture between the two lip incisions; one extremity of this suture is then carried upwards in the soft structures of the cheek to issue at the incision above the zygoma after passing deep to this process. Similarly the other extremity of the suture is carried upwards to issue at the same wound, but passes superficially to the zygoma; the two ends are then tied, and the angle of the mouth is thus looped up as much as may be necessary. Mommburg reports the cosmetic effect of this operation to be good, and publishes illustrations which support his contention.

Busch had previously reported a similar operation with good result.

Nerve Injuries.

Sherren[7] writes on the importance of recognizing injuries to nerves at the time of the accident; primary suture may be expected under good conditions to lead to complete recovery; but after secondary suture the prospect of complete recovery is not so good, and sensory recovery is rarely perfect. With regard to the operation itself, he lays emphasis on three points: (1) That the sutures must be of absorbable material; (2) That the wound in the nerve must be protected; (3) That in wounds in the region of the wrist the deep fascia must be united separately. He recommends wrapping the sutured nerve in Cargile membrane to prevent the formation of adhesions to the surroundings. If the deep fascia in the region of the wrist is not sutured separately, tendons usually become adherent to the skin, and their mobility is thus considerably restricted. After the operation the paralyzed muscles must be kept relaxed by the application of suitable splints, and their nutrition maintained by massage until voluntary power is restored. If after-treatment is neglected, the

operation is likely to prove useless. In all wounds it is very necessary to take measures to prevent nerves becoming involved in scar tissue. This is particularly important in wounds of the finger: in every amputation here the nerves should be seen and cut short. In a case in which there are signs pointing to the involvement of nerves in scar, re-amputation should not be done in a haphazard way. Operations should be carried out with a definite object of finding and cutting short the involved nerve.

J. Shelton Horsley[8] reports a case in which the left recurrent laryngeal nerve was injured in a bullet wound. He saw the patient about three months after the injury, when all the muscles supplied by the nerve were completely paralyzed. The injured nerve was easily found, the affected portion was excised, and the ends sutured with chromic catgut. Two months after the operation signs of recovery in the affected muscles commenced, and a report, fifteen months after the operation, stated that recovery of function was complete.

Els[9] reports five cases of injury to the musculospiral nerve complicating fracture of the humerus, treated by liberation from callus. The first was in a boy of eight years of age; two months after the fracture of the lower end of the humerus there was a complete paralysis of the muscles supplied by the musculospiral, and reaction of degeneration; recovery commenced six weeks after freeing the nerve, and became complete. The second case was a man of twenty-two years of age; the operation was done seven months after the accident, on account of complete musculospiral paralysis; the nerve was compressed by a scar, and recovery followed its freeing. In the third case there was immediate and persistent paralysis, which appears to have been due to laceration. In the fourth case the paralysis was also immediate, and in both a good result was obtained. In the last case the paralysis supervened six weeks after the accident; the nerve was compressed by cicatrix, and stretched over the edge of the lower fragment; a report two months after operation showed great improvement of the paralysis. The observations show that neurolysis in such cases may be expected to be followed by early restoration of function. Associated with this must be the removal of any bony protrusion and the protection of the nerve against further encroachment by scar.

Scudder and Paul[10] have analyzed a series of eleven cases of musculospiral paralysis complicating fracture of the humerus, all submitted to operation; in eight cases a good result was obtained. The three unsuccessful cases are as follows: (1) Male, aged 29; fracture of the middle third of the humerus, nerve injury discovered at the time of accident. At the operation three months later the nerve ends were found separated some distance; they were freshened and sutured; no improvement three years later. (2) Male, aged 15; nerve involved in callus, resected and sutured four months later; at a second operation the bone was shortened by resection, and the nerve, which was found bulbous, was again resected and sutured; after sixteen years there was no return of function. In case (3), union of a fracture was

complete in six weeks, but paralysis of the nerve was discovered later. The nerve was freed and sutured at an operation which took place one year and seven months after the injury; there was no improvement twelve years later.

The paper is summarized as follows: Musculospiral paralysis occurs in from 4 to 8 per cent of cases of fracture of the humerus. Fracture of the middle third of the humerus is the one most commonly complicated by musculospiral paralysis. Fracture of the humerus at any age may be associated with musculospiral paralysis. Musculospiral paralysis is primary if it dates from the accident, and secondary if it is subsequent to the accident. Primary paralysis of the musculospiral nerve indicates a more severe injury to the nerve than does secondary paralysis. The diagnosis of the exact pathological condition of the musculospiral nerve following trauma to it is of the greatest importance, and is difficult to determine. Progressive impairment of function or stationary paralysis of the musculospiral nerve complicating fracture of the humerus, justifies and may demand operation. Operation means the release of the nerve from compression or tension, often resection and suture, and always guarding against recurrent compression or stretching. A late suture (months after the injury) is attended by technical operative difficulties not present in an early suture (soon after the injury). Resection of the humerus to allow of approximation of the divided ends of the musculospiral nerve is a good procedure (Allis, Philadelphia), but not until nerve suture *à distance* has first been carefully employed. Electrical reactions cannot determine the pathological condition. They are of value in determining the course of events. The prognosis after operation is good; the earlier a necessary operation is done the speedier the cure. Exercise of paralyzed muscles by electric stimulation (galvanism) is helpful. Sensory symptoms are variable; in general, the sensory symptoms have no relation to the degree of motor loss.

Harrison[11] reports two cases of musculospiral injury. In the first the nerve was severed and the extremity involved in callus. As approximation was impossible, a flap was turned down consisting of half the thickness of the upper end of the nerve. This was sewn to the lower end with catgut. After a year's treatment the patient could extend the hand and fingers fully, and sensation was restored. The second case was peculiar in that the nerve was wound around the shaft of the humerus at the seat of fracture and imbedded in callus. It was necessary to divide the united humerus in order to restore the nerve to its natural position; two and a half months later the patient could extend the hand to an angle of 150°, and was improving rapidly.

Infantile Paralysis.

As introductory to the question of surgical treatment of this condition two articles require notice. Verga[12] has studied by experiment the regeneration of the peripheral nerves after section. The work was done principally on the sciatic nerve of the rabbit and

the dog; the suture material used was both silk and catgut. He confirms the theory of regeneration from the central end and his conclusions may be summarized as follows: Suture of the nerve extremities brought into contact by Schüller's method of elongation allows the repair of as much as 2 to 3 cm. loss in continuity; repair is identical, whether suture is lateral or terminal. Suture without approximation gives equally good results whether silk or catgut is used. The effect of Vanlair's method of tubular suture by the use of fresh arteries to ensheath the nerve extremities is satisfactory, but the use of rubber ensheathing tubes gives only moderate results, and the same may be said for the metallic tubes of Payr. By the method of transplantation, whether homoplastic or heteroplastic, apparent reunion can be obtained; but the transplanted fragment invariably degenerates, and serves only as a guide to the new nerve fibres growing from the central end. The method of bridging a gap by turning down a flap of nerve tissue should be abandoned; it aggravates the lesion. Perfectly good results are obtained by the method of lateral implantation. Histologically, the healthy fibres of the implanted nerve can be demonstrated passing into the distal nerve.

Stoffel[13] has carried out a series of observations to determine the question whether in a nerve trunk the fibres destined to supply individual muscle-groups occupy a consistent anatomical position. After a series of dissection observations on nerves obtained from still-born infants, he established that the branches of a nerve preserve their independence, and that it is possible in each large nerve trunk to establish an anatomical topography of the transverse section. The nerve trunk is therefore comparable to an electric cable of insulated wires. It follows from these observations that when a large nerve trunk or cord is exposed, it is possible to recognize by their position the nerve fibres in it which belong to its ultimate branches of distribution. The author has established the anatomy of the musculospiral, ulnar, circumflex, and sciatic nerves after this manner. The importance of the research in regard to the question of nerve-root and nerve-trunk transplantation is obvious.

An article by Tubby[14] deals with the treatment of distal infantile nerve paralysis by anastomosis. There are six cases of this kind reported, four of which showed distinct evidence of a more than partial recovery. In the remaining two, no clinical signs of regeneration were apparent, even after four years.

Stoffel[15] reports four cases of nerve-grafting for infantile paralysis in the upper extremity. He considers that the results obtained were functionally superior to those which could have been expected from arthrodesis of the shoulder or transplantation of the great pectoral muscle.

Warrington and Murray[16] report five cases with no obvious improvement.

Stoffel[17] returns to the subject in a criticism of the article by Warrington and Murray. He holds faults in technique responsible

for the failure recorded by the latter. In this, however, he is not convincing, but he makes some important points in the course of his criticism. In the first place he emphasizes the importance of recognizing that the cross section of a nerve has a definite topography (this was not demonstrated until long after Murray's operations). Next he draws attention to the fact that to obtain a good result the affected nerve must be connected up with a nerve which is healthy. In the third place he states that it is necessary to cut across fibres of healthy nerve if they are to grow into the degenerate nerve. These points are no doubt of great moment.

Another contribution to the subject is contained in an article by Allison and Schwab[18] on muscle isolation and nerve anastomosis. They record operation on three cases of poliomyelitis anterior, with some improvement.

These cases are of interest, but are not reported in such a way that any definite conclusions can be drawn from them.

Congenital Spastic Paraplegia (Little's Disease).

In 1905 Spiller suggested resection of the posterior roots for the relief of spastic paralysis. Articles by Foerster in 1908 and 1909 reported operations for this purpose by Tietze on the recommendation of Foerster. During the past year a number of publications have appeared. Foerster's original paper[19] was on "a new method of treatment in spastic paralysis by resection of the posterior spinal roots." He has recently written again on the same subject.[20] He points out that there are two components in the crippling of these patients: the one paretic, involving a loss of control over voluntary movement; the other spastic, involving a loss of control over reflex mechanism and terminating in contracture. Even in severe cases some voluntary innervation remains, the loss of control being mainly due to spastic phenomena. He proposed, therefore, to free the limbs from the spastic condition by resection of the posterior roots. It was not proposed that all these roots should be resected, and as a rule not more than two adjoining. For example, in spastic paralysis of the lower extremity the roots suitable for resection are L.2, L.3, L.5, and S.2. If resection is limited to this, then interference with the sensory phenomena is for the most part avoided.

In other cases, for example where there is severe contracture of the knee, a suitable combination would be L2, L3, L5, and S1, or a more extensive resection than this may be advisable. In cases where the upper extremity is involved, the roots suitable for section are C4, C5, C7, C8, D1. Regarding the indications for the operation, it is suitable for employment in true spastic paralysis, and particularly in the case of patients who cannot walk, and those who present extensive involuntary spastic movements. The type of affection causing the spastic condition, in other words, the situation of the interruption, is not of importance in regard to the indication for operation; but processes which have come to an end, for example, Little's disease,

are more suitable than conditions which are still in progress. Old healed angular curvatures with paralysis are more suitable than cases in which the disease is still in progress, and a hemiplegia in a young man resulting from syphilitic endarteritis is more suitable than hemiplegia in an arteriosclerotic. Most favourable of all are the cases of Little's disease ; the greater the voluntary movement remaining, the better will be the result.

With regard to the technique of the operation, the whole is best carried out in one stage, in order to limit the possibilities of infection. An extensive laminectomy is necessary. Study on the cadaver before operation is essential ; a valuable landmark is given by the fact that the first sacral pierces the dura at the level of the fifth lumbar spine. The dura must be sutured with great care, and also the overlying soft parts. A uniform result is obtained ; that is to say, the spastic contractures disappear or lessen. At first, movements of the spine are painful, but this disappears. Several weeks later the patient should be given exercises in the sitting posture, and may turn about, lying on the back. Progress is gradual, and to obtain a really good functional result, certain plastic operations on the tendons, lengthening or shortening as the case may be, are necessary. In all cases the operation on the roots may be trusted to remedy the spastic condition itself.

A number of contributions to the study of this operation have appeared during the year. The following is a summary:—

Spiller and Frazier,[21] and later Spiller alone,[22] report three cases, the first a male, aged 43. Resection of posterior roots of L2, L3 and L5, followed by disappearance of spasticity. The next case, aged 24, resection of C5, C6, C7, C8 posterior roots. Eight weeks later, almost complete disappearance of athetoid movements ; spasticity considerably diminished, but by no means abolished. In the third case, division of L3, L5, and S1 was made. One month later, no apparent spasticity of lower limbs.

Clark and Taylor[23] report three cases. Taylor performs a hemilaminectomy. An incision is made on one side of the middle line, the muscles retracted, and the laminæ denuded. The laminæ are resected, a longitudinal incision is made in the dura mater, and the roots c t. By this method he has thrice resected the posterior cervical roots, once the dorsal roots (7 to 10 inclusive on both sides), and once the lumbar roots on one side. In the three cases the desired object of relief of the spasticity was obtained ; and much improved functional results, aided by exercises. The cases were cerebral diplegia following scarlatinal meningo-encephalitis, left hemiplegia from birth, right hemiplegia from birth.

Goyanes :[24]—Spastic phenomena in the lower limbs following a fall, associated with incontinence of urine and acute pain in the lumbo-sacral region. Walking difficult ; right leg showed contracture in adduction. Three pairs of roots were resected, L2, L3, and L4. The contracture of the right leg remained ; the patella reflex was abolished

on the right side; anæsthesia to cold, heat, and pain in areas corresponding to nerve root sections. No trophic disturbances. Functional result apparently indifferent. The case is worth recording, but appears to have been somewhat imperfectly planned.

Hevesi:[25]—A girl aged 11 years. Spastic paraplegia with the thighs flexed. Adducted and rotated inwards, the knees in semi-flexion, also the tibio-tarsal joints. Operation in one stage. Resection of L2, L3, L5, and S2 on the right side, L2, L4, and S1 on the left. The rigidity of the limbs was much diminished, and the exaggeration of the reflexes disappeared. Functional improvement; no supplementary tenotomies performed.

Codivilla[26] also reports a case treated by posterior root section alone. Operation in two stages. Section on right side L3, L5, and S2, on left side L5 and S2. Result five months later: definite but slight improvement. Reflex spasm diminished, and walking easier. The improvement greater on the right side, where three roots were cut, than on the left, where section was made of two only. Codivilla considered that the result obtained in his case was not superior to that which could have been produced by elongation of the tendo Achillis—certain tenotomies and myotomies, followed by immobilization in a good position. He considers that to obtain a good result by root section it is necessary to attack the roots from the twelfth dorsal to the second lumbar, as well as those below, but to divide these roots incompletely instead of resecting them. It is legitimate to ascribe the comparatively poor result in this case to the limited number of roots attacked. Codivilla raises the question whether section of the roots may exercise a deleterious effect on the cells in the anterior horn.

At the German Surgical Congress, 1910, an important discussion was held on the subject.[27] Küttner reported operation on 10 cases: no mortality. He presented 7 patients who were able to walk, which had been impossible before operation. In another case he had successfully resected cervical roots for painful spasm of the upper limb. Foerster reported 5 cases operated on by Gottstein: 1 spastic paraplegia consecutive to encephalitis, 1 spastic paralysis of the right arm due to cerebral syphilis, 2 cases of Little's palsy, 1 spastic paraplegia from multiple sclerosis. One of the cases of Little's disease associated with epilepsy died several days after operation in an epileptic crisis; the multiple sclerosis case succumbed to influenzal septicæmia. The three other cases lost their spastic contractures and recovered voluntary movement. Wendel reported a good result in a case of wound of the spinal cord. Klapp stated that the results obtained in Berlin were very satisfactory. One death had resulted from pneumonia. It had been noted, however, in several cases, that the spasm abolished by operation returned, in part, after a certain time. Biesalski advised treatment first by the methodic exercises and massage; and if these failed to give a good result after a year's trial, recourse to root section. Of two cases on which he had operated, he lost one from infection

consecutive to a dermatitis provoked by tincture of iodine. Gaebell had operated on two cases. In both, the roots attacked were the second, third, fifth lumbar, and second sacral. Marked improvement followed in each. Tietze reported 8 cases: 2 of Little's disease, 2 of multiple sclerosis, 2 of post-apoplectic paraplegia, 1 of paraplegia consequent on Pott's disease, 1 of paralysis consequent on fracture of the spine. Three were children, five adults; the operation was apparently more serious in the latter. He had had 3 deaths, 2 from shock, 1 from meningitis. The functional results had been good in the cases of Little's disease and in the case of Pott's disease, bad in the other cases. He regarded Little's disease as the condition for which the operation was chiefly indicated.

Allison and Schwab[28] have proposed a method of treatment for spastic paralysis consisting essentially in the temporary suspension of conductivity in the nerves to the affected muscles by the injection of alcohol into the nerve trunks. They have treated conditions other than that of spastic paralysis by the same method, for example, complicated tic movements and spastic conditions following apoplexy. They have treated in the same manner nine cases of cerebral diplegia and hemiplegia, and the nerves attacked have been the obdurator in adductor spasm, the nerve to the hamstrings, the internal popliteal to the calf muscles, and the anterior tibial nerve to the extensor group. Two died of pneumonia. In one case of cerebral hemiplegia the athetosis stopped. The paralysis was unaffected. Four cases of cerebral diplegia markedly improved: one was cured to the extent that walking and co-ordination are practically normal; two cases were relieved of cross-legged progression; the fourth was relieved of adductor over-action and was still under treatment. In one case of quadriplegia in which standing was impossible, the patient after operation was able to stand, and has since made considerable improvement under exercise. In one of spastic hemiplegia, the operation was effective in overcoming the action of the hamstrings; the over-action of the calf muscles was not checked owing to faulty technique, but the gait was much improved. Observations on the five cases in their last paper is reported for the following periods: three and a half months, four months, six months, six months and thirteen days. It is impossible to make an estimate, therefore, of the final results of their method. Important questions which will have to be answered are: Is the spastic condition permanently or only temporarily relieved, and is the power of the muscles involved damaged by the injections, and to what extent?

Tabes.

The operation devised by Foerster for the relief of spastic paraplegia has been employed in cases of tabes presenting gastric crises. At the German Surgical Congress, 1910, a discussion was held on the results.[29] Küttner, who was the first to practise the operation, believes that it is much graver than in Little's disease; he has performed the operation three times. His first case died five months

after from pulmonary tuberculosis which existed before the operation; the result of the operation was that the crises disappeared. The second case died from infection. The third case dated only from five weeks before report; he had stood the operation well, and the crises had not so far reappeared. Tietze reported one case: the sixth to the ninth dorsal roots being resected on both sides, the crises had disappeared, but the operation had only been performed ten weeks. Moszkowicz also reported a recent case (six weeks) so far satisfactory. In these cases it has seemed necessary to the operators to resect a considerable number of roots; thus Küttner resected the sixth to the tenth, Foerster the sixth to the eleventh inclusive.

Flörcken[30] reports an operation by Endlen with the same object; the fifth, sixth, seventh, eighth, and ninth dorsal roots were resected. The painful crises which had previously troubled the patient disappeared, and the condition had remained satisfactory for six weeks; the operation was performed in two stages.

De Haan[31] publishes an operation concerning a tabetic affected with gastric crises for a year. About 1 cm. of the seventh, eighth, ninth, and tenth posterior dorsal roots was resected. The progress of the patient after operation was interrupted by several complications. He had one attack similar to those which had troubled him before, a month after the operation, but no more. Thomas and Nicholls[32] operated on a man, aged thirty-two, affected with gastric crises for eight years and a morphinomaniac. The seventh, eighth, and tenth dorsal posterior roots were cut, with relief to his crises; the case was recent at the time of publication.

Gotzl[33] reports the case of a man, aged forty-six, with severe gastric crises and undoubted tabes. In this case the tenth posterior dorsal roots were the only ones resected. The operation was followed by severe abdominal pain which required morphine. For eight weeks there was a serous discharge from the wound, for three months the gastric crises ceased, and in this respect the operation was completely successful. There was a slow increase in weight, but much less rapid than that reported by Foerster and Küttner, this being ascribable to the advanced stage of the disease.

A case reported by Bruns and Sauerbruch is quoted by Thomas and Nicholls[34] as a success, in that it was followed by relief from the crises. It is to be observed, however, that fifteen weeks after the operation attacks of severe abdominal pain supervened, but these were apparently not of the nature of crises.

The object of this operation is to interrupt the reflex arc, of which the sympathetic and the vagus are terminals. Obviously it would only be suggested in cases in which the crises are of exceptional severity, and are unrelieved by internal medication. The question of how many roots are to be attacked is undecided at the moment, but in the most favourable case of all, that reported by Küttner, the seventh, eighth, and ninth dorsal, and later the tenth dorsal, were resected.

Chronic Localized Meningo-myelitis.

This condition, which was mentioned in the *Medical Annual* last year under the title of "Chronic Spinal Meningitis," has received further clinical illustration. Krause[35] has described three cases and written an important criticism on the subject. He points out that Charcot described a condition, which he termed *pachymeningitis cervicalis hypertrophica*, apparently identical with what other authors named *meningomyelitis cervicalis chronica*. The latter title is to be preferred, since the cord itself is involved in the condition. The dura, arachnoid, and pia are all involved in the process. Until recently, the condition was not of surgical interest, but Krause describes three cases in which the changes found were characteristic; in all three the diagnosis before operation was tumour of the meninges. The morbid anatomy appears to be identical with that of the cases of Spiller,[36] Warrington, and Monsarrat.[37]

In Krause's three cases the condition was thoracic; the meninges were adherent to one another and formed a mass, firm in consistency and adherent to the cord, so that it could not be separated from the latter by blunt dissection. In one case within the affected area the anterior surfaces of the resected laminæ were adherent to the fibrous mass, and had to be separated piecemeal. The clinical signs were those of a severe spinal paralysis from compression, and simulated the signs of an intravertebral growth. The cord was involved, not only by pressure, but also in the process itself. In one case a focus of softening was opened in the posterior part of the cord, and in another case there was a kind of cyst formation. The causation of the condition is obscure, but it has been described in relation to three chronic infections: tuberculosis, chronic osteomyelitis, and lues.

Operative treatment consists in slitting the dura and removing the mass; this is better than simply slitting the dura. In one case Krause was content with the latter, and in this instance there was evidence of a further spread of the chronic inflammatory process after the operation. Improvement is to be expected from operation, but when the cord is distinctly encroached upon, complete recovery can hardly be looked for. In one of Krause's cases the sensory symptoms completely disappeared, whereas the spastic and paralytic phenomena were little changed. In another case the motor functions were markedly improved.

Munro[38] describes a similar lesion to the above under the title, *circumscribed perimedullary meningitis*. The actual lesions found by this author appear to have been of a less organized and fibrous nature than that in Krause's cases. Munro's cases are six in number. He says that at the time of operation, when the laminæ have been resected, a tense dural sac presents, non-pulsating; when the dura is opened a small quantity of cerebrospinal fluid escapes; then through the opening in the dura the pia mater herniates, more or less thickened, and infiltrated by fluid within its meshes. If the pia mater is incised,

liquid escapes ; in some cases the fluid may form an actual cyst. The examination of the wall of the cyst shows only delicate connective tissue covered by a flat endothelium. The clinical diagnosis has almost always been a tumour compressing the cord. In Munro's six cases there were two post-operative deaths ; in the remaining four there was a progressive improvement in all the symptoms after the operation.

Mendel[39] reports a single example of the same condition. The patient was aged twenty-three, and had had symptoms for three years. There was spastic paresis of the left lower limb, and a minor degree of the same condition on the right side. Tactile sensibility was diminished on the left side up to the tenth rib. Thermal sensibility was absent over the same area. These sensory phenomena were present, but less marked, on the right side. The operation was done in two stages. The dura mater was found extremely thickened over an area from the fifth to the ninth dorsal vertebræ ; it was adherent on the one hand to the bone, on the other to the cord. The condition was most marked on the left side and at the level of the sixth dorsal vertebræ. The patient died from pneumonia some days later. Histological examination showed no specific change, but only that of fibrosis. The newly-formed connective tissue involved both dura mater and the overlying membranes, and also penetrated into the adjacent part of the cord. The only peculiar change observed was in the vessels, and suggested a circumscribed syphilitic meningomyelitis, the lesion having begun as a hypertrophic dorsal meningitis, and the cord being involved secondarily.

Spinal Tumours.

A number of cases of tumour of the spinal canal and cord have been reported during the year. It is not necessary to do more here than to catalogue the important points.

Strumpell[40] reports the case of a man, aged forty-two, who had suffered for many years from neuralgic pain in the right arm and the right side of the chest ; difficulty in walking supervened owing to paresis. An intradural tumour was removed from the level of the first dorsal vertebra. The patient had completely recovered seven weeks after the operation.

Cassirer and Krause[41] describe the case of a man, aged forty-six, who had had symptoms for a year, beginning with pain between the shoulders ; gradually the signs of compression of the cord at the level of the second dorsal vertebra supervened. A tumour was removed from within the dura. Histologically it proved to be a fibroma. The patient made rapid progress towards recovery.

Hildebrand[42] reports the case of a woman presenting the phenomena of compression of the cord at the level of the fifth and sixth cervical vertebræ. A reddish-brown tumour was perceived after incision of the thickened arachnoid. Histologically it proved to be a perithelioma. There was marked collapse after the operation, but the patient

recovered, and at the time of report the paralytic symptoms were much improved. Hildebrand also reports another case with symptoms almost identical. There was the same paralysis of the limbs ; the same operative treatment ; but in this case there was not a tumour, but an encysted serous meningitis. The encysted collection was evacuated, and the paralytic symptoms almost completely disappeared. The patient was seventy-one years of age.

Grinker[43] reports the case of a girl, aged twenty-three, from whom Plummer removed a fibromyoma growing from the inner side of the dura opposite the third dorsal vertebra. The symptoms were unilateral pain, gradually becoming bilateral, followed by motor paralysis of first one lower limb, then the other, and associated with sensory and sphincter paralysis. After the operation there was complete recovery of the sensory and sphincter symptoms, and partial recovery of the motor functions. The latter were, however, very much improved.

Owen[44] describes a case of a man, aged thirty-seven, whose first symptom was pain in his right side. The leg was also clumsy and a little weak. Before operation, paralysis became absolute below the middle dorsal region. Crawford removed a pear-shaped tumour attached to the post-dorsal root on the right side. Improvement set in at once, and at the time of report the patient walked perfectly ; the sphincter had recovered and the pain was gone. There still remained some spastic condition in the lower limbs.

Bailey[45] reports three cases. In the first, a man, aged forty-six, had spastic paralysis in the legs and paralysis in the small muscles in the hand and wrist, more pronounced on the left side. There was some blunting of sensibility, but too indistinct for purposes of localization. His first symptom was pain in the left arm. An intradural tumour was removed, with a particle attached to the pia. Histologically it was a neurofibroma. The patient died five days after the operation. The second case was a woman, aged forty-five, who had had pain and weakness in the right leg for three years. At the time of examination she had symptoms of compression of the cord at the level of the ninth dorsal vertebra. A glioma was removed by Abbe. The patient recovered satisfactorily from the operation, but her progress six months later was not encouraging. In the third case, a woman had had disturbances of sensation in both feet for five years before admission, and there was diminution of sensibility up to the level of the crest of the ilium. A tumour was removed from within the dura and adherent to the latter. The patient died on the day following the operation.

Elsberg[46] reports an interesting observation in connection with operation for spinal new growths. His operation was performed in two stages. In the first stage the spines and laminæ were removed, the dura was incised, and a tumour could be seen overlying the pia mater. An incision was made through the overlying pia, but the operation had to be interrupted owing to the general condition of the patient. At the second operation, a week later, the tumour was found almost entirely extruded from its bed, and was removed with the

greatest ease. Elsberg believes that operation for tumours of the spinal cord in the cervical region should always be done in two stages, the first stage ending with an incision in the dura, or if the tumour is beneath the pia, with an incision in the latter.

Unilateral Laminectomy.

Taylor[47] has suggested a procedure less traumatic than the usual bilateral laminectomy. He makes an incision just to one side of the spinous processes, and this is deepened close to the sides of these processes. With a saw, the laminæ are divided at their junction with the bases of the spinous process, and another line of section is made well out towards the articular processes. An elevator then raises the loosened lamina, and this and the remainder above are lifted out with forceps. He has found that this operation gives sufficient access for resection of the nerve roots on both sides of the cord and for dealing with tumours.

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NEURALGIA.

Purves Stewart, M.D., F.R.C.P.

We may define neuralgia as paroxysmal pain, either in the cutaneous distribution of a sensory nerve, or along the course of a nerve-trunk. Pain localized in this fashion must be the result of some morbid condition in the sensory path; and therefore, in every case of neuralgia, our first duty is to search for signs of a local irritant, and if such be found, to remove it, if possible. In many cases, however (the so-called idiopathic variety), no local cause can be discovered. The co-existence of anæsthesia in the painful area is evidence of an organic neuritis. So also is the presence of muscular weakness or atrophy, changes in any deep reflexes, etc.

Idiopathic neuralgia is rare in childhood or adolescence, but is common in adult life, especially in middle age, men being more often attacked than women. Patients with gouty, rheumatic, or neuropathic

tendencies are specially liable. Malnutrition, debility, and neurasthenia are common predisposing causes. So also are influenza and anæmia.

In every case of trigeminal neuralgia, we should search for local abnormalities in the territory of the nerve, especially in the teeth, gums, nose, and its accessory sinuses, also examining the eye for errors of refraction, glaucoma, iritis, etc. Brachial neuralgia may be symptomatic of deep-seated cervical growths, or of a cervical rib, but in such cases there ultimately develop evidences of an organic neuritis, such as muscular weakness and diminution of sensation, thus taking the case out of the category of mere neuralgia.

We have also to bear in mind the various "reflected" pains in visceral disease, such as the shoulder-pain of hepatic disease, the arm-pain of angina pectoris and other heart affections, the abdominal pain of various gastric and intestinal maladies, the sacral and femoral pain of dysmenorrhœa, the testicular pain of renal colic, the iliac pain of some ovarian diseases, etc.

The pain of neuralgia is generally unilateral. If it is bilateral it is usually asymmetrical. A bilaterally symmetrical pain should always make us suspect some central organic disease. The pain of neuralgia is usually in the same distribution in successive attacks; less commonly the pain changes from one nerve-area to another. The paroxysms of pain vary in their duration from a few seconds up to many minutes. At the climax of a paroxysm, the pain may radiate into adjacent nerve-areas, and although ordinarily unable to bear the lightest touches at the painful spot, the patient may clutch this area in despair during an attack, or even rub it violently. This is especially the case in trigeminal neuralgia. Between the paroxysms there is usually a continuous dull pain; less commonly the patient feels quite well in the intervals. The attacks of pain may occur spontaneously, or they may be excited by local stimuli such as light pressure, or, in the case of trigeminal neuralgia, by speaking, chewing, washing, etc. The intervals between them are variable. Some cases have daily attacks, others have a batch of attacks within a few days, and then an intermission of weeks or months. Not infrequently, paroxysms occur at the time of the menstrual period.

Another important characteristic of neuralgia is the frequent presence of so-called "tender spots" about the diameter of a finger-tip. These spots, which are exquisitely tender on pressure, are situated along the course of the affected nerve at special situations, viz.: where the nerve emerges from a bony foramen, where it crosses a bone fascia or other rigid structure, where it breaks up into its terminal branches, and where it perforates the deep fascia and becomes subcutaneous. Sometimes we also find tenderness over the spinous process of the corresponding vertebræ. These "tender points," although valuable as corroborative evidence of neuralgia, are not invariably present. Sometimes the whole nerve-trunk is tender on pressure.

It is unnecessary to describe in detail the various forms of neuralgia which we meet with in practice. Amongst the commonest varieties

are trigeminal neuralgia (tic douloureux), cervico-occipital, brachial, intercostal, mammary, lumbo-abdominal, and testicular neuralgia, also sciatica and coccygodynia.

The TREATMENT of several special varieties of neuralgia was considered in last year's *Medical Annual* (see articles on "Coccygodynia," "Sciatica," and "Tic-douloureux"). We will therefore only discuss the commoner measures at our disposal for neuralgia in general. In every case we must first try to determine whether we have to do with a pure neuralgia, or with a neuralgia which is symptomatic of some underlying organic condition such as neuritis. We carefully seek for all sources of peripheral or reflex irritation. If such source be found, we endeavour to remove it. But whether we find a local exciting cause or not, we must, in every case, endeavour to relieve the patient's pain. In those who are emaciated, neurasthenic, or hysterical, it is necessary to attack the general condition by diet, rest, massage, and psychotherapy. Severe cases are best treated in a nursing-home, not in their own houses. Gouty individuals should be treated on ordinary lines by diet, diuretics, baths, etc.

Let us now turn to the treatment of actual painful paroxysms. In cases of recent onset and moderate severity, the pain is often relieved by a small **Fly-blister** at the tender spot, or by the application of the point of a **Paquelin Cautery.** Sometimes we can relieve the pain by a **Galvanic Current** of 15 to 20 m.a.; the séances last about twenty minutes, the positive pole being applied to the painful area. We should be careful to turn on the current gradually, and not to apply it so strong as to cause discomfort. Or we may employ the galvanic current to carry drugs through the skin by kataphoresis. This so-called "**Ionic Medication**" (see *Medical Annual*, 1909 and also *pages* 33, 92 of the present volume), is attained by means of a galvanic current, which splits up the electrolytic substance into its opposing ions, positive and negative, whereby one ion is driven through the unbroken skin by the current, and absorbed into the tissues. Positive ions (an-ions) are carried in by the negative pole, and conversely, negative ions (kat-ions) are carried in by the positive pole. Thus, if we moisten the negative pole of a galvanic circuit with a solution of iodide of potassium or of salicylate of soda, the positive ions of iodine or of salicylic acid are carried in by kataphoresis. On the other hand, alkaloids such as quinine, cocaine, morphine, aconitine, etc., act as negative ions, and are applied locally through the positive pole.

Neuralgia is a malady where special analgesic drugs have their sphere *par excellence*. Their name is legion. The best known belong to the coal-tar group, and include the following: **Acetanilid** or **Antifebrin** (1 to 3 gr.), **Antipyrin** or **Phenazonum** (5 to 20 gr.), **Aspirin** or **Salicyl-acetic Acid** (10 to 15 gr.), **Butyl Chloral Hydrate** (5 to 20 gr.), **Caffeine Citrate** (2 to 10 gr.), **Chloral Hydrate** (5 to 20 gr.), **Exalgin** or **Methyl-acetanilid** ($\frac{1}{2}$ to 2 gr.), **Quinine Hydrobromate** (1 to 5 gr.), **Pyramidon** (5 to 8 gr.).

NEURASTHENIA.

Arsentriferrin in (*page* 18) ; **Physostigmine Salicylate** in (*page* 45).

NEURITIS.

Electricity in (*page* 92).

NOSE, DISEASES OF THE. *W. Milligan, M.D.*
D. Lindley Sewell, M.B.

Adenoid Vegetations.—Eustace Smith[1] describes a consequence of adenoid vegetations in the naso-pharynx which is at times overlooked. From the post-nasal catarrh there results a liberal secretion of thick and acrid mucus which flows down over the pharynx and is frequently swallowed, setting up gastric disturbance ; or, again, from the naso-pharyngeal irritation a troublesome reflex cough may result. Associated with the gastric disturbance is loss of appetite, and if the derangement is severe, periodical attacks of vomiting may occur in which large quantities of mucus, at times blood-stained, are ejected. The stomach itself is frequently thought to be the seat of the mischief, and is treated on the usual lines without result. Troublesome cough is very frequent, although no physical signs of disease are evident in the lungs ; the cough indeed may be the only symptom, and this may occur in paroxysms and be associated with the expectoration of large quantities of mucus. The patients, in spite of the vomiting, rarely show signs of malnutrition, probably owing to the large quantity of milk which is forced on them in their refusal of solid food. Treatment consists in the removal of the adenoids without delay.

Rhinorrhœa.—E. B. Waggett[2] recommends 20 gr. of **Calcium Lactate,** with or without the addition of **Magnesia,** daily in the treatment of hay fever and paroxysmal rhinorrhœa.

R. Lake[3] has obtained most satisfactory results from the internal administration of **Chloride of Calcium** (gr. 30 to 45 per diem) for a period of from two to three weeks.

Suppurative Ethmoiditis.—Hajek[4] describes a case of acute suppuration of the ethmoidal labyrinth with well-marked exophthalmos, in a patient suffering from chronic suppuration in the right maxillary antrum, who caught a severe chill. Practically the whole of the ethmoidal cells became infected, and this led to a dilatation of the posterior part of the labyrinth, with bulging outwards into the orbit ; the orbital tissues, however, showed no inflammatory manifestations. The ethmoidal cells were opened freely by intranasal methods, and the protrusion of the eyeball quickly disappeared.

The case is of interest in showing that a dilatation of the bony wall of the ethmoidal labyrinth may occur as a result of acute or chronic suppuration, a condition which is extremely rare, and about which Hajek had previously been sceptical.

REFERENCES.—[1]*Pract.* Jan. 1910; [2]*Lancet,* Aug. 13, 1910 ; [3]*Brit. Med. Jour.* July 9, 1910; [4]*Zeits. f. Laryng.* Bd. i. Heft 6.

ŒSOPHAGUS, DISEASES OF. *Priestley Leech, M.D., F.R.C.S.*

Œsophageal Diverticula occur somewhat rarely; but C. H. Mayo,[1] of Rochester, reports six cases in which operation was done with perfect relief, and two cases which have not been operated on. In diagnosis the œsophagoscope is useful, but requires a good deal of practice. Radiography, after filling the sac with a mixture of acacia and bismuth, is of marked value in indicating the size, shape, and location of the pocket. He draws attention to one means of diagnosis used by Dr. H. S. Plummer, which has not attracted the attention it deserves. The patient is instructed to swallow three yards of button-hole silk twist, and the next morning to swallow three more yards of the continuous thread; if there is an opening through the stricture or diverticulum, this thread will be washed on into the stomach, and from there into the bowel, a sufficient distance to stand traction without being withdrawn. The examination is now accomplished with a whalebone stem, and several sizes of olive tips to attach to it. The thread is passed through an opening in the end of the olive and out of its side. The probe is passed down the œsophagus on the thread, which is held loosely until obstruction is encountered. If the trouble is due to stricture, the tip will not change its level when the thread is tightened; but if there is a diverticulum, the probe will be elevated to the level of the opening into the lower œsophagus, proving at once the existence of a pocket, and also its depth, by the amount of elevation of the probe on tightening the thread. It is not necessary to perform gastrostomy for the purpose of feeding these patients preparatory to operation; the thread can be left in place, and by its means the stomach-tube may be passed when desired for feeding. Before operation the sac should be emptied of food, etc., as otherwise its contents may escape during operation and be drawn into the bronchi. In one case where this occurred, Mayo lowered the head as in the Trendelenburg position, and the inhaled matter ran out.

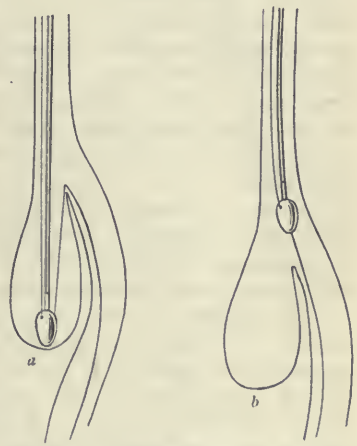


Fig. 47.—(*a*) Œsophageal probe bulb threaded on a swallowed thread passed into diverticulum. (*b*) Probe bulb elevated by tightening the thread, showing depth of sac.

Robinson[2] reports a case in which operation was successful.

De Witt Stetten,[3] of New York, gives a list of operations for the extirpation of œsophageal diverticula, 60 in number; of these, 50 were cured and 10 died, a mortality of 16·6 per cent. Out of 48 cases of direct excision there were 9 deaths, a mortality of 18·7 per cent. Of the 5 patients on whom a preliminary gastrostomy had been

performed before the sac was excised, 1 died, a mortality of 20 per cent. All the cases operated on by the other methods recovered. The causes of death were inanition, infection and sepsis, pneumonia or pulmonary gangrene, hæmorrhage, colitis, and suppression of urine. A diagnosis of malignant stricture has often been made in these cases, and gastrostomy performed to prevent the patient dying of starvation. The main symptom is dysphagia.

As regards the operation, Stetten advises dividing the neck of the diverticulum with the cautery between a stout catgut ligature applied close to the œsophagus and a clamp applied distally; cauterize the stump thoroughly to disinfect it, and invest it by a purse-string non-penetrating catgut suture of the submucosa, and suture the muscularis over it. If the neck of the sac is too thick to ligature, excise and close the opening with interrupted catgut sutures. Invagination of the sac without opening it is only applicable to small diverticula, and even then is not ideal. Free drainage must be provided from the lower part of the wound. If possible, give nothing by the mouth for five days, then sterile water and liquids, and at the end of ten days solid food. Saline per rectum and nutrient enemata for the first week.

Cancer.—The surgical treatment of cancer of the œsophagus has not been very successful. The introduction of the œsophagoscope, however, is likely to lead to better results in cancer of the cervical portion. Morriston Davies[4] classifies cases in the cervical œsophagus as follows: (1) The growth extends too far into the posterior mediastinum to permit of removal; (2) A small part only of the circumference of the œsophagus is involved; (3) The whole or greater part of the circumference is invaded by the growth, but the total length does not extend to more than 2 cm. ($\frac{3}{4}$ inch); (4) Where the length is greater than 2 cm., or there is involvement of the trachea or larynx in addition. In the first case operation is impossible. Cases belonging to the second group are rarely seen, but operation could remove the growth, and the wound might be nearly closed. In the third class it may be possible to excise the growth with a margin of healthy tissue around it, and unite the divided ends by suture. Leakage is apt to occur, and the external wound should not be completely closed. It is essential to limit the spread of discharge from the œsophagus, and this can be done to a great extent by deep stitches bringing into apposition the surrounding muscles, and covering as far as possible the carotid sheath by suturing the adjacent muscles over it. Another method is to introduce Gluck's œsophageal tube into the œsophagus. In all cases dissect out the glands, whether infected or not. The essentials to success are thorough cleaning of the mouth and removal of carious teeth before the operation, the introduction of Gluck's tube as soon as the anastomosis is complete, and the approximation of all the adjacent structures between the skin wound and the œsophagus, to prevent the spread of infection among the tissues of the neck.

The last group of cases includes those where the ends of the œsophagus cannot be approximated, and perhaps a portion of the trachea has to be excised ; in the latter case the lower end must be sutured in the wound and a tracheotomy tube tied in. The two ends of the œsophagus are also sutured to the edges of the wound. Later, the continuity of the tube can be restored by a plastic operation replacing the excised portion of the œsophagus by a tube formed from the skin which lies between the cut ends of the œsophagus. The greatest danger of these operations is septic invasion of the cellular planes in the neck, and drainage must in all cases be provided for.

Foreign Bodies.—Grey Turner[5] reports a case of impaction of a halfpenny in the œsophagus, and one year and ten months later, death from hæmorrhage due to perforation of the aorta by the impacted coin. The patient, a boy, four years of age, had taken his ordinary food, and had had no difficulty in swallowing. Turner thinks that the serious possibilities associated with these impacted bodies are not sufficiently realized : fatal accidents resulting therefrom are more common than is generally thought. During the last six years no less than five cases have come under his notice in which death has been due to perforation of the aorta by foreign bodies : two from impacted rabbit bones, two from perforation of aorta by a fish bone, and the one now reported. During the same period, a man died after removal of a plate of teeth by posterior mediastinal œsophagotomy, and another in consequence of the impaction of a tooth-plate in the pharynx. He thinks that in the future, in cases of doubt, the œsophagoscope will prove of immense value in the surgery of foreign bodies.

References.—[1]*Ann. Surg.* June, 1910; [2]*Pract.* Aug. 1910 ; [3]*Ann. Surg.* Mar. 1910 ; [4]*Brit. Med. Jour.* Feb. 12, 1910 ; [5]*Lancet*, May 14, 1910.

OPHTHALMIA. (*See* Conjunctiva, Diseases of.)

OPHTHALMIA NEONATORUM. (*See* Labour.)

OPTIC NEURITIS. *A. Hugh Thompson, M.D.*

The opinion now generally held among pathologists as to the optic neuritis of cerebral tumour is that there is no actual inflammation, but that the swelling is mechanical, due either to distention of the nerve sheath, caused by an increase in intracranial pressure or, as Thomson Henderson believes, to an increase of venous pressure which, being unbalanced by a corresponding increase of intra-ocular tension, causes swelling and exudation at the optic disc.[1] The old term "choked disc" is really more appropriate, therefore, than optic neuritis ; a more scientific term introduced by Parsons to express the same thing is "papillœdema." Clinically, however, the term optic neuritis is so well-established that it seems hardly worth while to discard it.

Plates XXIX, XXX, XXXI, show the actual appearance of the disc in this condition. They are from three cases of cerebral tumour in which the eyes were removed afterdeath, and in each case both eyeballs,

after being frozen, were bisected, photographs being taken of the posterior half. Sir Victor Horsley uses them to illustrate his theory of "ipsolaterality,"[2] i.e., that the amount of swelling is most marked in the eye corresponding to the side of the brain in which the tumour exists. Besides the actual swelling, a certain amount of exudation in the nerve fibre layer at the edge of the swollen disc is not uncommon, also hæmorrhages at or close to the disc, and all these symptoms are, according to Horsley, most marked on the side of the tumour. Since, however, the swelling of the disc is merely a stage, which in untreated cases that survive inevitably goes on to atrophy, it may easily happen that at a later stage of the disease the actual amount of swelling is greater in the eye least affected, so that in making a diagnosis of the probable position of a cerebral tumour, the age as well as the degree of the swelling of the disc must be taken into account. With this proviso, Horsley finds that there is a very marked correspondence between the eye with the greater neuritis and the side of the brain on which the tumour exists. In 18 unselected cases examined during a single year (1908), in all but three the tumour was "ipsolateral," and only in one case was it "contralateral." In two cases the correctness of the localization diagnosis depended wholly on the degree of the neuritis, so that if these observations are confirmed, their importance is great. They are disputed, however, by Paton,[3] a colleague of Sir Victor's, who disbelieves in the significance of "ipsolaterality" and does not acknowledge that it existed in many of the 18 cases in question. Further, out of 102 cases examined which showed no signs of subsidence or atrophy in either eye, Paton found that in 54 cases the swelling was equal to within half a dioptre on the two sides. In 25 cases it was greater on the side of the tumour, and in 23 it was greater on the opposite side. There is obviously room for a third unbiassed opinion on this subject.

As to treatment, the question of **Trephining** in these cases is one of the gravest that the surgeon has to face. There is no doubt that the cause of the optic neuritis is an excess of intracranial pressure, and further, it is possible to relieve this by removing a portion of the skull and making a free incision into the dura mater. If the pressure remains unrelieved, the neuritis is practically sure to pass into atrophy, and the patient will become nearly, if not totally, blind. These are the grounds on which Horsley advocates trephining in all these cases. Risien Russell[4] agrees with him. No case of optic neuritis, he says, due to increase of intracranial pressure, should be allowed to go on to atrophy and blindness, when by opening the skull and dura mater sufficiently, the sight may be saved. On the other hand, the question must arise in the case of an irremovable tumour, Is the gain sufficient to justify the operation? Further, it must not be forgotten that a great many of the cases that have been operated upon have died of shock. When all goes well, the operation no doubt is a brilliant success; but it is not one to be lightly undertaken.

Optic Neuritis and Ear Disease.—Barr and Rowan[5] have investigated

PLATE XXIX.

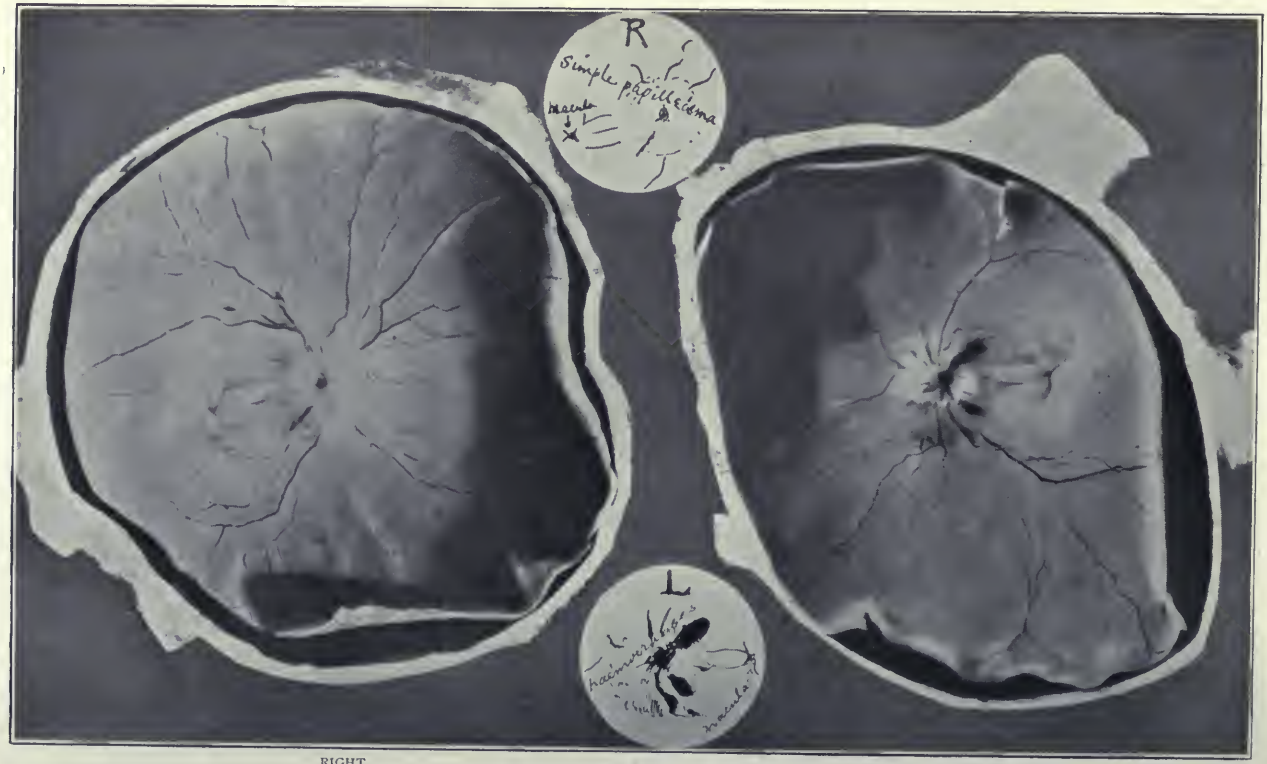
TUMOUR OF LEFT TEMPORO-OCCIPITAL REGION (SIR VICTOR HORSLEY).

RIGHT LEFT

Note specially the white (degeneration) spots grouped around the nasal disc margin at point of greatest tension. The swelling and changes are most intense on the side of the tumour.

PLATE XXX.

TUMOUR OF LEFT FRONTAL LOBE (SIR VICTOR HORSLEY).



RIGHT

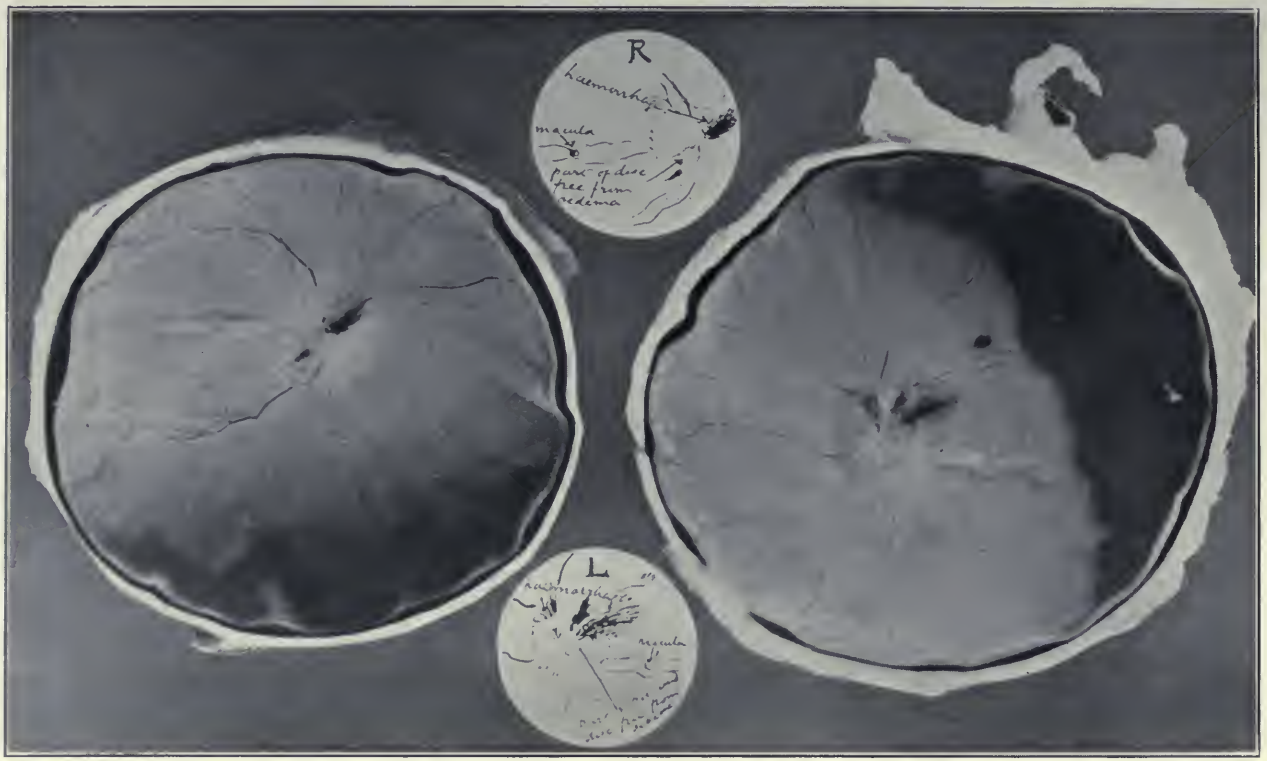
Hæmorrhage shortly before death, causing severer papillædema and hæmorrhages on the ipsolateral side.

LEFT

No degeneration spots, owing to the brief clinical duration of the neuritis.

PLATE XXXI.

TUMOUR OF LEFT LATERAL CEREBELLAR RECESS: MARKED IPSOLATERALITY (Sir Victor Horsley).



RIGHT LEFT

Note the topographical distribution of the papillœdema on disc: that is, most at the upper border, least at the inferior temporal region.

the frequency with which optic neuritis occurs in purulent disease of the middle ear. In a first series of 100 cases they found 4 in which there was definite optic neuritis, and in a second series of 60 cases they found 7. In many of these cases the degree of neuritis appears to have been slight; but in many other cases in which there was no actual neuritis, vascular engorgement was noted, and in three of these the condition had developed into actual neuritis when the patients were re-examined after an interval of a few months. In only four cases was the neuritis pronounced, and in only one was it noted to be passing into atrophy. In no case was the vision definitely affected at the time of examination. With regard to the question of "ipsolaterality," "in 125 of the 160 cases one ear only was affected. In 21 of these, the evidences of vascular engorgement were confined to, or more marked in, one eye; in 14 to the eye of the affected side, and in 7 to the eye of the unaffected side. In all the other cases—104 in number—the ocular condition was equally marked in both eyes, or the fundi were normal. It may thus be said, without, however, attaching too much importance to the point, that there is a greater tendency for the eye on the same side as the ear affection to show vascular changes." In those cases in which there was no neuritis, the termination of the ear disease was more favourable on the average than in those in which optic neuritis did develop, so that the relation is one of some importance in prognosis.

REFERENCES.—[1]*Glaucoma* (Arnold), p. 216; [2]*Brit. Med. Jour.* Mar. 5, 1910: [3]*Ibid.* Mar. 12, 1910; [4]*Ophthalmoscope*, 1909, p. 590; [5]*Brit. Med. Jour.* Mar. 26, 1910.

OTITIS MEDIA. (*See* EAR, DISEASES OF.)

Hexamethylenamine in (*page* 31); **Vaccine** treatment of (*page* 60).

OTOSCLEROSIS. (*See* EAR, DISEASES OF.)

PALATE, DISEASES OF. *W. Milligan, M.D.*
D. Lindley Sewell, M.B.

Roe[1] publishes a long paper on palato-pharyngeal adhesions, which he differentiates as follows: (1) Adhesions of normal palate or pillar, or both, to an ulcerated pharynx; (2) Adhesion of ulcerated palate or pillar, or both, to a normal pharynx; (3) Adhesions of one pillar and one side of the palate to the pharynx; (4) Adhesion of the border of the palate to the pharynx, except a small opening in the centre; (5) Adhesion of the entire soft palate to the pharynx; (6) Adhesion with marked cicatricial thickening and narrowing of palate, pharynx, or both; (7) Association of the latter with cicatricial adhesions to the base of the tongue or larynx. Such conditions may be (*a*) Congenital; (*b*) Simple inflammatory—catarrhal; (*c*) The result of excoriation of the mucous membrane from acrid discharges; (*d*) Local manifestations of the exanthemata; (*e*) Local manifestations of tuberculosis and syphilis; (*f*) Traumatism.

Contrary to the general opinion that there must of necessity be

two ulcerated surfaces opposing each other, it is certain that simple inflammatory or catarrhal inflammation, in which plastic lymph is thrown out on the surface, may readily cause adherence of the two surfaces. The usual cause is, however, tertiary or congenital syphilis, where two denuded surfaces oppose one another and where adherence is favoured by gravity when the subject is in the recumbent position, and also by impairment of the action of the pharyngeal dilators. Among traumatic causes must be mentioned gunshot wounds, substances accidentally driven through the mouth, laceration of the fauces during surgical operations, and the use of caustics or the galvano-cautery. Paul, out of thirty cases of adherent palate, found that twenty-six were due to tertiary syphilis. Cartaz found thirty-two out of thirty-nine due to the same cause.

The distinctive feature of syphilitic adhesions is marked contraction, while adhesions from other causes are usually more simple, as if the parts were glued together, and are unattended by marked distortion. Considering the frequency of tertiary ulceration in the naso-pharynx, adhesions would be much more frequent were it not for the movements of the muscles and the motions of the parts in the acts of swallowing, speaking, and breathing.

Should the palate become perforated and do away in large part with such movements, adhesions are much more frequent. Complete union of the palate to the pharynx is the exception rather than the rule, for it is rare that a small opening cannot be found through which a slender probe may be passed. The degree to which the ears and hearing became affected depends largely on the extent to which the tubal orifice or the tubal muscles become involved, and is entirely independent of the closure of the post-nasal space below. The voice, which usually is nasal in tone and sometimes almost unintelligible, may occasionally be almost unaffected. In the treatment of these conditions it is important to delay any operative procedure for the relief of the adhesion until all ulceration or inflammation has subsided. It is only in the early stages of syphilitic manifestations in the throat, before the tissues have broken down, that any constitutional treatment is of avail ; when ulceration has occurred, administration of large doses of iodides can only arrest the process, and synechiæ are sure to result.

The chief difficulty in the treatment of palatal adhesions does not lie in the freeing of the adhesions, but in maintaining the opening during the process of healing. The adhesions are usually liberated with a rectangular knife or scissors, a sound or probe being introduced through the nose. Hajek adopted a method of repeated incision and repeated stretching by packing the wound with gauze ; more recently he has used a mechanical dilator having two blades for inserting behind the uvula and palate ; the patient may be taught to use this instrument himself.

Other operators have adopted various methods of suturing the parts after division, such as passing ligatures through the soft palate and drawing it as far forward as possible from the pharyngeal wall by

passing the ligatures out of the mouth and suturing them round the ears. Such methods were frequently unsuccessful, and led to the plan of using a lead plate suspended behind the velum of the palate by two strings passed through the nostrils. This, although usually successful, was objected to on account of cutting off the nasal respiration ; a difficulty which was overcome by using fenestrated obturators, which were held in place by being attached to tooth-plates.

Fig. 48.—Two rings of silver wire, the dotted lines indicating their location, passing out through opening in centre under uvula.

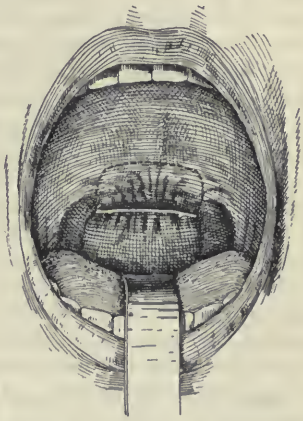


Fig. 49.—Single ring of silver wire, the dotted line indicating its passage above the adhesion behind the palate.

The most recent advance in the treatment of palato-pharyngeal adhesions consists in the plan of introducing silk sutures at the side of the palate and allowing the sutures to remain *in situ* until a healed channel had taken place around them. The palate is then liberated between these two channels, great care being taken not to wound the outer wall of the channel. In these cases the writer has employed this method with good results, using silver wire instead of silk sutures (*Figs.* 48, 49).

REFERENCE.—[1] *Jour. Amer. Med. Assoc.* Jan. 15, 1910.

PANCREAS, SURGERY OF.

John B. Deaver, M.D., LL.D.
D. B. Pfeiffer, A.B., M.D. } *Philadelphia.*

Acute Pancreatitis.—During the past year the surgery of the pancreas, which is now in the making, has been the subject of several illuminating contributions. A case of hæmorrhagic pancreatitis is reported in full by James R. Judd,[1] three cases of pancreatic hæmorrhage and acute pancreatitis are recorded by Joseph Ransohoff,[2] and six of acute pancreatitis by John B. Deaver.[3] The interesting question of the relation of infection of the biliary tract, and especially of gall-stones, to this form of pancreatitis, is still in abeyance. Since Opie's original case of acute pancreatitis, in which it seemed

positive that the condition was precipitated by a gall-stone lodged in the ampulla of Vater, causing the retrojection of bile into the pancreatic ducts, an observation which was fortified by the work of Flexner and others demonstrating experimentally that the injection of bile or of bile acids into the ducts would give rise to a similar condition, attention has been focussed upon this mechanical cause of acute pancreatitis. Previous observations, which indicate that while this may be the method of production of certain cases it cannot be the sole cause, are confirmed by these reports. In Judd's cases the gall-bladder and ducts were apparently normal, and in two of the three cases of Ransohoff the biliary tract seemed uninvolved. Of Deaver's cases, however, four of the six (67 per cent) had gall-stones. He states that in two additional recent cases personally communicated to him, no gall-stones were present. He found no evidence in favour of a primary autodigestive process as advocated by Doberauer and Guleke, and on the whole inclines to the view that the process is due to an infectious agent. "So many substances act as stimuli to the disintegration of the pancreas by so-called autodigestion that it seems likely that bacteria can also do this." Ransohoff, on the contrary, cites two of his cases, in which the bleeding was early and striking in amount, as instances of pancreatic apoplexy. He quotes Hlava, who found that both the intraperitoneal effusion and the exudate within the pancreas were sterile, and believes that "they are probably in the beginning, at least, not of an infectious nature." In both these cases fat necrosis had not occurred, and he is inclined to believe also that they support the view that hæmorrhage antedated the disorganization of the pancreas, a long-mooted point of discussion. It may be said, however, that while the hæmorrhage was the overshadowing clinical feature, it by no means precludes the possibility of local disintegration of a portion of the pancreas, with erosion of the vessels in that locality.

The symptomatology is often distinctive. Errors are due usually to the relative infrequency of the condition, by which the clinician is caught off his guard, or to the very severity, which makes it difficult to secure a history from the sufferers, and demands hasty intervention for the relief of what is evidently an "intra-abdominal catastrophe." Both Deaver and Judd quote approvingly Fitz's classical statement of symptoms: "Acute pancreatitis is to be suspected when a previously healthy person or sufferer from occasional attacks of indigestion is suddenly seized with violent pain in the epigastrium, followed by vomiting and collapse, and in the course of twenty-four hours, by a circumscribed epigastric swelling, tympanitic or resistant, with slight rise of temperature." In the acute and ultra-acute cases, as classified by Robson, many observers have testified to the excruciating, agonizing nature of the pain, often resisting anodynes in any safe amounts. Concerning its location, there is general agreement that it is upper abdominal. The attempt at more accurate localization results in disagreement among observers. This is probably a corollary to its

intensity, the sufferer himself being unable to determine more closely the seat of his great indefinable agony. Some have stated that localization to the left of the median line possesses considerable significance. In Judd's case, and in two of Ransohoff's cases, it is specifically noted that the pain was greatest in the epigastrium and to the right. Deaver states that " the absence of localization of the pain to the left side should not influence us in the least in estimating the importance of this symptom." Epigastric tenderness is present usually to a greater or less degree. Vomiting is practically a constant feature, and not infrequently so prominent a symptom as to give rise to a diagnosis of high obstruction. It is noteworthy, however, that the vomitus is, as a rule, biliary in character, never stercoraceous. Persistent and uncontrollable belching and hiccoughing are frequently marked, and may help to a correct interpretation of a lesion in the neighbourhood of the diaphragm. Collapse is often very marked, and the patient, whether operated on or not, may quickly succumb. Usually there is a rally. Cyanosis is always mentioned as a symptom, but occurs in only a small percentage of cases. Both pulse and temperature are usually lower than in acute accidents in which sepsis plays a more important part, though both may mount with the lapse of time and the onset of added infection. It is worthy of note that the same slow pulse and low temperature are common to the early stages of acute intestinal obstruction.

If the patient survive the initial stage, certain other symptoms may make their appearance. Evidences of intestinal paresis, which gradually subside as the attack moderates, are usual. A more or less well defined mass may form in the epigastrium, and occasionally a slight icteric tinge of the skin and conjunctivæ may appear. The amount of extravasated blood may be sufficiently large to give dullness in the flanks. Occasionally there may be impaired resonance and breath sounds over the lower lobe of either lung, usually the left.

It is true, of course, that pancreatitis may assume different phases and varying degrees of severity, so that the picture just outlined may differ in detail and degree.

The important question of the treatment of these cases is now before the profession for adjudication. It is assumed that no one would attempt to treat any case which presented such symptoms as the above without having the surgeon immediately in consultation. Hitherto, experience has shown that the great majority of cases are encountered by the surgeon as a disagreeable surprise on entering the abdomen for supposed intestinal obstruction or perforation of one of the hollow viscera, especially stomach, appendix, or gall-bladder. The practical problem is therefore of two kinds: (1) What should the surgeon do when he finds this unexpected condition of affairs? (2) What should be his attitude should the diagnosis be established with reasonable certainty before operation? The answers to these questions will differ materially with the stage and pathology of the lesion. From the view that it is a mistake to operate in the stage of initial shock there will

be few to dissent. Indeed, it may be a surgical certainty that death will be precipitated by the added strain of anæsthesia alone. This may be apparent quite independent of the diagnosis. If the nature of the case be recognized and the general condition be such as to afford a certain margin of safety, we believe the best result will still be secured by taking advantage of the fullest rally that the patient can muster. We cannot too quickly warn that the diagnosis must be practically certain before adopting delay, for the result of operating in pancreatitis before the optimum moment is far less disastrous than delay in cases of obstruction or perforated viscus. Such a patient should be under constant observation, and just as soon as it is evident that improvement has come to a standstill, operation should be done. This moment is to be decided upon by attention to the facies, the pulse, and the behaviour of the symptoms. This may be a matter of hours or days. If of hours only, the chances are that the case is of the fulminant variety associated with extensive hæmorrhage and beginning disorganization of the pancreas. In these cases the prognosis is bad, whether operated or unoperated. Operative aid is limited to the provision of adequate drainage locally for the pancreas, and generally for the products of exudation already present in the general cavity. The simplest procedure which can accomplish these objects is the best. In one of the first cases of this kind reported, that of Halsted, the evacuation of the free fluid in the abdominal cavity was the only thing attempted, and while it may be true, as Körte has remarked concerning this case, that the patient recovered in spite of, and not because of, the operation, yet it is doubtful if recovery would have taken place with any added toxins for him to overcome. Ebner, quoted by Ransohoff (loc. cit.), two years ago, tabulated 20 unoperated cases with 2 recoveries, and 36 operations with 17 recoveries. In 1908, Mayo Robson collected 59 operations with 23 complete recoveries. A suprapubic stab-wound with tubular drainage into the pelvis seems best calculated to carry off the accumulations in the general cavity. A great quantity of blood, detritus, and exudate may be present in the lesser peritoneal sac and in the areolar tissue surrounding the pancreas. Direct drainage for this material is the greatest desideratum, both to prevent its spread and absorption and to give the pancreas opportunity to recover itself. It is the accomplishment of this object which is rendered so difficult by the sequestered retroperitoneal position of the pancreas. Five routes are possible: (1) Through the gastro-hepatic omentum; (2) Through the gastro-colic omentum; (3) Through the transverse mesocolon; (4) Through the foramen of Winslow; (5) Through a loin incision into the lesser peritoneal cavity. Concerning the relative advantages of these routes we have as yet too little experience to speak positively. In the early stages of the acute fulminating cases the abdomen will already have been opened anteriorly. If it be determined to drain through this incision, the most direct route to the seat of greatest accumulation should be chosen, and both tubular and gauze drainage inserted. Judd, in his recovered

case, entered through the gastro-hepatic omentum, punched a hole into the head of the pancreas with a blunt instrument, and inserted a cigarette drain. The question of the advisability of incising the capsule of the pancreas for the application of our drains to its exposed surface is still an open one, though Noetzel (quoted by Deaver, loc. cit.) takes a strong stand against it. In our opinion, the utility of the last-mentioned approach, namely, through the loin, has not been sufficiently appreciated. While it may be inadvisable to employ it in addition to the anterior incision in early desperate cases, yet in those who bear operation well, and especially in those who show large fluid collections in the lesser peritoneal cavity and in the vicinity of the pancreas, it may be indispensable. In the last two cases reported by Deaver, large quantities of purulent exudate were evacuated in this manner. In the first case this was done after cholecystostomy for co-existent gall-stones had been performed. In the other case, during convalescence the whole of the tail of the pancreas was passed through this wound as a gangrenous slough. (In this case no anterior incision was made.) This could not have occurred with anterior drainage. Both patients made perfect recoveries. The advantages of loin drainage may be summarized as follows: (1) It is direct; (2) It is dependent; (3) It is easily made sufficiently large to permit exit of sloughing tissues; (4) It provides better drainage for the peripancreatic tissues. Both tubular and gauze drainage should be used.

The answer to the first question propounded, namely, the attitude of the surgeon upon discovering an unexpected pancreatitis, is contained in the above considerations. He should not consider that he has committed a surgical blunder and retire, but rather should institute those measures appropriate to the case, with the assurance that if his judgment as to the patient's general condition was not at fault, he has increased the chances of recovery. Acute pancreatitis is now as certainly a surgical condition as any of the other abdominal catastrophies.

Chronic pancreatitis is discussed by Ochsner[4] in a paper upon the clinical aspects. He states that "if we add to the well-known symptoms of cholecystitis an area of tenderness from 5 to 10 cm. long, located to the right of the umbilicus over the middle of the right rectus abdominis muscle, in cases in which we can exclude a diagnosis of duodenal ulcer, we have the typical symptoms on which to make a diagnosis of chronic pancreatitis." Attention is drawn to the emaciation and anæmia of advanced cases. The presence of typical butter stools and the absence of trypsin in the stools, as shown by Mueller's test, are regarded as significant. Cammidge's test is criticized on the ground that "it requires too much of the personal element of the observer to make the method useful except in the hands of unusually skilful experts." The treatment is that of the almost invariably associated pathological conditions of the biliary tract, with special reliance upon biliary drainage.

Resection of the Pancreas.—John M. T. Finney[5] reports a case of

resection of the middle portion of the pancreas, which was occupied by a firm nodular encapsulated tumour, later diagnosed as a benign cystadenoma. The mass had been palpable for three years, and, strange to say, was freely movable, so that its connection with the pancreas was not suspected before operation. The route chosen was through the gastro-hepatic omentum. After excision, the two fragments of the pancreas were united by suture, the line of suture being packed about by a cigarette drain of iodoform gauze. Convalescence was slow but uninterrupted. The fistula occasioned by the drain discharged pancreatic fluid copiously for about three months, but recovery was eventually complete. Sixteen additional cases of resection of the pancreas are summarized in the article.

Pancreato-enterostomy and Pancreatectomy.—Under the above title a most interesting and suggestive contribution to experimental pancreatic surgery is given by Robert S. Coffey.[6] Many excellent illustrations of the procedures are included. The work was carried out upon dogs, and the cut end of the pancreas was used for implantation into the gut. Only the conclusions can be given here :—

"(1) From these experiments, it has been learned positively that the cut end of the pancreas may be implanted into a loop of intestine with practically the same assurance of primary union as could be expected from a gastro-enterostomy. (2) The dangers of fat necrosis and pancreatic necrosis in pancreato-enterostomy are apparently no greater than the dangers of sepsis in gastro-enterostomy, except in that pancreato-enterostomy is a much more delicate and technically a more difficult operation. (3) It seems that when the pancreas is cut in two, the duct retracts into the pancreatic substance, and is covered by the healing process, unless it is kept open by a flow of pancreatic juice which can find no other easy exit. (4) An isolated portion of the pancreas which has been implanted will maintain communication with the intestine, usually through the end of the duct, but there seems to be special tendency to follow out a thread when present instead of the duct if the duct has been cut off even with the pancreatic tissue. (5) Ligation of the duct of Wirsung produces no pancreatitis or pancreatic necrosis when pancreato-enterostomy is performed at the same time ; while ligation of the duct of Wirsung without pancreato-enterostomy produces serious consequences in many cases, as shown by all experimenters. (6) The duct of Wirsung is the normal exit for the pancreatic fluid, just as the pylorus is the normal exit for the stomach fluids. So, just as the stomach canal circumvents a ligature which has been placed around the pylorus for the purpose of forcing the gastric fluid through a new opening, so the pancreatic juice circumvents a ligature which has been placed around the duct of Wirsung for the purpose of forcing the pancreatic fluid through a new opening. But it is quite probable that the duct of Santorini could be developed into a substitute for the duct of Wirsung in some cases by planting the tail of the pancreas, and thus using the upper end of the duct as a safety valve during the process

of development of the duct of Santorini to sufficient size to carry all the pancreatic fluid, after which the duct of the implanted tail would probably close. (7) A bile-duct which has been transplanted by the direct method, becomes widely dilated and at the same time thickened by intra-intestinal pressure of some kind, which may have a very important bearing on this subject. (8) The persistency with which the cut ends of the ducts tend to heal over leads us to fear the possibility of the eventual cicatricial narrowing of these ducts in some cases unless a special method is used."

In the second series of operations, means were devised to prevent the healing pancreatic tissue from covering its end ; also a method to close the ducts of Wirsung and Santorini simultaneously with the implantation of the tail ; thirdly, a physiological method for implanting the common duct ; and fourthly, experiments are cited to show the impracticability of implanting the stripped pancreatic duct directly into the intestine. The experiments made clearly "indicate to the mind of the writer at least that pancreato-enterostomy will fill the same place in pancreatic surgery as gastro-enterostomy occupies in the surgery of the stomach."

References.—[1]*Ann. Surg.* Dec. 1909 ; [2]*Ibid.* May, 1910 ; [3]*Amer. Jour. Med. Sci.* Dec. 1909 ; [4]*Jour. Amer. Med. Assoc.* May 28, 1910 ; [5]*Ann. Surg.* June, 1910 ; [6]*Ibid.* Dec. 1909.

PANNUS.

(*Vol.* 1910, *p.* 240)—Treacher Collins recommends treatment by one application of Jequiritol (Merck's extract of abrin) in strong solution.

PAPPATACI FEVER. (*See* Phlebotomus Fever.)

PARALYSIS. (*See* Nervous System, Surgery of.)

PARALYSIS AGITANS.

Pituitary Ext. in (*page* 47).

PARALYSIS, GENERAL. *Bedford Pierce, M.D., F.R.C.P.*
Norah Kemp, M.B., C.M.

The nature of the relationship between general paralysis and syphilis still remains in doubt, although the doctrine that syphilis is an essential factor in the development of tabes and general paralysis is gaining adherents. Even Dr. Ford Robertson[1] considers the rôle of syphilis important, in that it weakens the tissues and renders them liable to invasion by the diphtheroid bacillus, which he believes to be the essential cause of the disease. He states, however, that there is no proof that syphilis is a constant antecedent of tabes. The whole subject is reviewed by J. W. Moore,[2] who concludes : (1) The weight of evidence is in favour of syphilis as an essential cause of general paralysis, and, if a history of the disease is not obtained, we are probably justified in supposing either the infection has been so slight as to escape notice, or that it was inherited. (2) Alcohol, trauma, and other factors merely play the part of lowering the general resistance, as they do in any disease. (3) Whether the occurrence of

general paralysis after syphilis is determined by a constitutional predisposition, by a special form of the virus, or by the incidence of some other factors, is not yet clear. (4) General paralysis must still be regarded as a meta-syphilitic disease rather than true syphilis.

In the same article Moore states that in a large number of cases about fifteen years elapse after the infection with syphilis before the development of the nervous symptoms. In this connection it may be noted that Marchand and Petit[3] record a case in which general paralysis appeared two years after infection, and the post-mortem findings confirmed the diagnosis. This interval appears to be the shortest hitherto recorded. Gilbert Ballet[4] states that six years is the commonest interval. It must not, however, be forgotten that in the lower animals lesions similar to those of tabes and general paralysis have been produced by the absorption of toxins along lymphatic channels, altogether independently of any question of syphilis.[5] Henry Lind[6] has attempted to confirm Ford Robertson's hypothesis that general paralysis is due to a specific diphtheroid bacillus, but the specificity of the *Bacillus paralyticans* was not demonstrated by his research.

Winifred Muirhead[7] records the findings with the Wassermann reaction in thirty-five cases of general paralysis and seventy-seven cases of mental disorder other than this disease, and contrasts the value of this reaction with protein reaction and the presence of lymphocytosis in the cerebrospinal fluid. The Wassermann reaction was found to be positive in the blood-serum and spinal fluid in a large percentage of cases of general paralysis, and negative in all the other cases examined ; but its absence does not exclude the possibility of general paralysis. The proteid reaction (whether Noguchi's or Jones' method) is present in all cases of general paralysis, but was also found to be positive to a slight degree in sixteen cases of other forms of insanity. An increase of lymphocytes was also found in the spinal fluid in all the cases of general paralysis, and in no other case of insanity examined. Dr. Muirhead concludes that the presence of lymphocytosis is the most reliable sign of this disease.

John Turner speaks highly of the Ross-Jones protein test of the cerebrospinal fluid, which consists of " the addition of clear cerebrospinal fluid to a saturated solution of ammonium sulphate, in such a manner that the fluid lies on the reagent without blending with it." In the case of general paralysis, tabes, and syphilis of the nervous system, a definite, sharply-defined, thin white film, which has very much the appearance, when looked at against a dark background, of a cobweb, is speedily formed. The reaction appears to depend upon the amount of globulin in the fluid. Turner has applied the test in ninety-five cases of insanity, and finds it " affords most valuable help in making a diagnosis in early cases of general paralysis, and in differentiating certain early cases of alcoholic insanity from general paralysis." He states that he has found this test more trustworthy than Wassermann's in general paralysis. He also confirms the opinion of other

authors that the Ross-Jones test is more trustworthy and simpler in application than Noguchi's butyric acid test. In twelve cases of dementia præcox, eight of epilepsy, eight of alcoholic insanity, and in sixteen unclassified, the Ross-Jones test gave a negative result; in only one of the latter was there a doubtfully positive result after twenty minutes. It was noteworthy that three cases of general paralysis were discovered by this test which had been overlooked before, and three others, which had been considered to be suffering from this disease, gave a negative result; of these, two proved to be of polyneuritic psychosis, and one of delusional insanity with paraplegic symptoms.

John Turner also considers that the value of a cell-count for diagnostic purposes is scarcely, if at all, inferior to the protein reaction, and is especially useful in early cases, when the number of cells found is generally greater. He quotes Joffroy, Mercier, and Frenkel as stating that cytosis precedes the appearance of pupillary symptoms. Only six out of fifty cases of general paralysis failed to exhibit cytosis, and if the number of cells fell below 5 per cmm. the result was considered negative. In forty-five other cases of insanity, only three showed slight lymphocytosis. Throughout these experiments he found in a few cases that lumbar puncture produced symptoms resembling sea-sickness, but no permanent ill-effects were observed.

The Treatment of general paralysis remains in the same unsatisfactory position. Ehrlich, at the International Congress on the Care and Treatment of the Insane, Berlin, 1910, spoke of the value of the new arsenical preparation, "606," in syphilis. He stated, however, that it was of little use in syphilitic affections of the nervous system, the reason probably being that the molecule of the drug was so large that it could not pass into the subdural space, and that it was not found to reach the cerebrospinal fluid. He said it was of the utmost importance to treat sleeping-sickness and general paralysis before the nervous system was attacked, and held out hope that this was becoming possible in the former disease.

References.—[1]*Jour. Ment. Sci.* Oct. 1910; [2]*Rev. Neurol. and Psych.* May, 1910; [3]*L'Encéphale*, 1910, p. 88; [4]*Ibid.*; [5]Orr and Rows, Jan. 1909, Ford Robertson, *Ibid.*; [6]*Jour. Ment. Sci.* Oct. 1910; [7]*Ibid.*; [8]*Ibid.* July, 1910.

PARALYSIS, INFANTILE (Polio-encephalo-myelitis Acuta).

Purves Stewart, M.D., F.R.C.P.

Increasing experience of various clinical syndromes which were formerly regarded as separate morbid entities, under such names as poliomyelitis anterior, polio-encephalitis inferior, polio-encephalitis superior, etc., has led to the conclusion that many of these should be grouped together into one great class—polio-encephalo-myelitis acuta. This is an acute disease, frequently epidemic, which may attack the cells of the motor grey matter at various levels, whether the cerebral or cerebellar cortex, the ocular nuclei of the mid-brain, the ponto-medullary motor nuclei, or the anterior cornua of the spinal cord.

The spinal cord, especially its lumbar and cervical enlargements, is more frequently attacked than the higher centres, as a statistical computation by Bremer[1] has shown. In his series of 171 sporadic cases, 50 had cerebral or cerebellar symptoms, and 11 of these had a combination of spinal and cerebral symptoms, while 121 had spinal symptoms alone.

It should be borne in mind that the grey matter of the spinal cord is continued upwards into homologous motor nuclei in the medulla, pons and iter. It is easy, therefore, to understand how poliomyelitis of the cord, and polio-encephalitis inferior of the medulla and pons, are essentially the same malady, differing only in anatomical localization. Numerous cases occur in which the symptoms of ordinary infantile paralysis of the limbs are combined with bulbar or pontine symptoms, showing that the morbid process has attacked the grey matter at widely different levels simultaneously.

Polio-encephalo-myelitis, whether confined to the spinal nuclei or to the medullary-pontine nuclei, or whether it be a combination of the two, is much commoner in children than in adults, and especially common in young infants. It has been suggested by Pierre Marie that this is due to a special vulnerability of the grey matter during infancy to various organisms or toxins.

Numerous epidemics of polio-encephalo-myelitis are now on record. Holt and Bartlett[2] find references to thirty-four epidemics prior to 1907, and since then some twenty epidemics, large and small, have been recorded, widely scattered in different continents, Europe, America, and Australia, but being apparently specially frequent in Norway and Sweden. Epidemics in England have been comparatively few. The epidemics seem to have happened with equal frequency in towns and in country districts, the later summer months being those in which most cases occurred. The advent of cold weather usually brings an epidemic to a close.

The occurrence of a febrile disease in epidemic form would naturally lead us on *a priori* ground to seek a microbic origin for the malady. As a matter of fact, various organisms have been described in the cerebrospinal fluid obtained by lumbar puncture in cases of infantile paralysis. Thus Giersvold[3] found a diplococcus in fifteen cases out of sixteen; this organism produced paralysis when injected intravenously into rabbits, white mice, and pigeons. Again, Pasteur, Foulerton, and MacCormac[4] obtained cocci from the cerebrospinal fluid in a case of infantile paralysis, and although they were unable to cultivate the organisms *in vitro*, injections of the cerebrospinal fluid into rabbits produced symptoms of paralysis, but without any definite pathological changes in the central nervous system. Strauss and Huntoon,[5] who obtained Gram-positive cocci in one instance, and Gram-negative bacilli in another, regard the bacterial findings in their own cases and in those of other observers as either contaminations or accidental invaders, not the causal element in the disease.

More recently, valuable experimental observations have been made

by Landsteiner and Popper.[6] These workers obtained the spinal cord of a nine-year-old child who had died within an hour of the onset of an attack of acute anterior poliomyelitis. No organisms could be found; but an emulsion of the spinal cord, when injected into monkeys, produced marked inflammatory changes in the spinal cord (guinea-pigs, mice, and rabbits showed no symptoms, nor did their spinal cords show any pathological change). Römer,[7] of Marburg, obtained similar positive results with intracerebral injections of spinal-cord emulsions in monkeys, and negative results in mice, guinea-pigs, and rabbits. Krause and Meinicke[8] have not only produced these same results, but have also been able to transmit the disease from monkey to monkey by intracerebral, intraperitoneal, intraneural, and hypodermic injections of emulsions of affected monkey's cord.

The non-transmissibility of the disease by inoculation of cerebrospinal fluid from patients at various stages of the disease, shows that the causal agent is no ordinary microbe. In many respects it is closely analogous to the virus of rabies. Flexner and Lewis,[9] of the Rockefeller Institute, obtained a portion of the spinal cord from a child who died on the seventh day of the disease; and in another case, which died on the fourth day, they secured the whole spinal cord. From this material they inoculated a series of monkeys. The disease was transmissible from monkey to monkey by inoculations of emulsions of the spinal cord. The virus, therefore, is one of extreme activity. Its nature has not yet been identified, and it is not arrested by the finest filter.

No cultures have been able to be grown in any of the ordinary media. Moreover, drying the virus for seven days over caustic potash does not diminish its virulence, nor does its admixture with glycerin (Römer and Joseph[10] corroborate this point), or with 5 per cent carbolic acid.

Further interesting questions arise with regard to the transmissibility of the virus of epidemic polio-encephalo-myelitis, its source of infection, its normal habitat, and its usual mode of communication in human subjects. Flexner and Lewis,[11] making use of the filterable nature of the virus, were able to detect it in the nasal and pharyngeal mucus of affected monkeys. They concluded that one path of elimination of the virus was by way of the nasal mucosa, through its lymphatic connections with the meninges. It is not improbable, therefore, that infection may occur in a reverse direction by this same route. To test this hypothesis experimentally, they scarified the nasopharyngeal mucosa in the monkey, and applied to the raw surface an emulsion of poliomyelitic spinal cord, which was repeated on the fourth day. On the seventh day, paralysis of the muscles of the neck and upper limbs appeared, the legs remaining strong; the animal died the same night.

The virus of the disease produces rapid and characteristic alterations in the cerebrospinal fluid and in the central nervous system. When a considerable dose of filtrate is inoculated by intracerebral injection, the cerebrospinal fluid obtained by lumbar puncture twenty-four hours later contains an excess of polymorphonuclear cells, with a few mono-

nuclear cells or lymphocytes. After forty-eight hours the numbers of white cells have increased, the polymorphs still predominating. After seventy-two hours the fluid is slightly opalescent, and the mononuclear cells are now in large excess. It is particularly to be noted that even with these marked changes in the fluid the monkey had not yet developed paralytic symptoms. Nevertheless, the cerebrospinal fluid, several days in advance of the onset of paralytic symptoms, contained the virus, and when injected intracerebrally, set up paralysis in another monkey, the symptoms appearing seven days after injection.

Should these observations on the cerebrospinal fluid be confirmed in the human subject, it is obvious that we shall secure a valuable means of diagnosis in early, abortive, and non-typical cases. Not only shall we have the cytological changes to guide us, but inoculation in the monkey may be capable of clinching the diagnosis, even in cases where the disease has proved abortive.

The average incubation of the disease in monkeys, and apparently also in human subjects, is about eight days, the experimental dates having varied from four to thirty-three days. In monkeys the mortality has been much higher than in human beings, no fewer than 50 per cent of the former having died. In man the mortality in different epidemics varies from 5 to nearly 20 per cent. The highest death-rate was 46 per cent in an epidemic in Sweden.

The pathological changes in the nervous system of the affected monkeys show a striking similarity to those demonstrated in human cases. It is well recognized that the affection in the spinal cord is by no means confined to the anterior cornua. The virus makes its way first to the meninges. Inflammatory changes are seen throughout the pia-arachnoid, with perivascular small-cell infiltration, vascular dilatation, œdema, and even small hæmorrhages. These appearances extend inwards along the pial septa, being specially intense in the region of the anterior horns.

Inflammatory changes are also seen in the meninges around the posterior root ganglia and posterior roots, and this would afford an explanation of the acute pains which are so often found clinically to usher in the disease, both in adults and in children.

An important feature of polio-encephalo-myelitis is its communicability, not only from one patient to another, but through the intermediation of carriers who may themselves escape infection. The occurrence of epidemics is one evidence of this, and numerous observations have been made showing that the disease is transmissible from one house to another, or that infection may remain in a house where the disease has already occurred. Perhaps the most striking evidence is that of Shidler,[12] of York, Nebraska, who describes an epidemic of 200 cases which occurred in July, 1909. Numerous families had several children, all of whom were attacked by the disease: thus, in one family of six children, all were affected; in another family of six, four cases occurred; in a family of five, four cases occurred; and in a family of four, all were attacked. Some of the cases illustrate

the infectivity of the disease. Thus, a woman went with her child to the wedding of a sister, in whose house a younger sister was ill with the disease. The mother with the child returned home, and nine days later, one of her own children showed symptoms of paralysis. In an adjoining house there lived a family of six children, all of whom developed the disease. A woman who came to visit this family brought her baby ; in five days it died of the disease.

Another extensive outbreak of infantile paralysis, which occurred in Massachusetts during the year 1909, was investigated by a committee of enquiry specially appointed by the Board of Health. One hundred and fifty cases were carefully studied by this commission, and numerous valuable data were collected and placed on record by Lovett.[13] The Massachusetts Commission found that density of population had no apparent influence, cases occurring with equal frequency in sparsely, and in thickly populated, parts of the same state. Most of the cases occurred in old houses. The disease does not appear to be associated with deficiency of rainfall, as was at one time suggested. Instances of direct contagion from child to child were observed, with an incubation period of one to fourteen days. A number of instances occurred of indirect contagion by a healthy carrier, and eleven of the 150 cases followed intimate contact with persons who had suffered from old infantile paralysis, even of many years' standing.

Curiously, also, nearly half of the cases gave a history of wading or swimming in sewage-contaminated water before the onset of the disease. Out of 150 cases, 62 had been swimming or wading just before onset. The Massachusetts epidemic also demonstrated the frequency of pain and tenderness, local or general, as an early and persistent symptom. Out of 502 cases in which this point was enquired into, no fewer than 420 (i.e., 84 per cent) had pain and tenderness. Finally, the Boston observers emphasized the fact that recovery from the disease occurs in a certain proportion of cases. Thus, out of 628 cases, 62 (or 10·8 per cent) had entire disappearance of paralytic symptoms, the duration of symptoms varying from three days to twelve weeks. There was no difference, either as regards the distribution of paralysis, or the occurrence of pain and tenderness, between the cases which recovered and those which did not.

Diagnosis.—It will be seen that in addition to the ordinary signs of acute poliomyelitis—fever, pains, malaise, tendency to profuse perspiration, leucopenia (Müller[14]), followed by acute flaccid paralysis, widely distributed in one or more limbs (less commonly in the muscles of the trunk, face, or even the ocular muscles), sensation remaining unaffected—we have earlier signs in the cerebrospinal fluid, signs which may be evident several days before the onset of paralytic phenomena.

Treatment will also be correspondingly modified. Prophylaxis during an epidemic will consist in the **Isolation** of affected individuals, and in the careful **Disinfection,** by suitable antiseptic sprays and douches, of the naso-pharynx in every person, especially every child, who may have been in contact with the infected family. The rooms which have

been occupied by actual patients should be disinfected, preferably by vapour of formalin. The internal administration of **Urotropin** is also advisable in view of the partial transudation of this substance into the cerebrospinal fluid in the form of formic aldehyde.

It is well recognized that one attack of poliomyelitis usually confers immunity against future attacks, recrudescences of the disease being rare, although Stephens[15] appears in several instances to have seen relapses. This being so, we turn with interest to certain studies in **Immunization** which have recently been carried on by various observers. Flexner and Lewis,[16] commencing with small hypodermic doses of the filtrate of spinal cord from a recently paralyzed animal, gradually increased the dose until, after four months, the monkey under observation was able to withstand a large dose of a virus of maximum potency. They have also made observations on the subject of passive serum protection, following the observation that monkeys which had recovered or survived from the paralysis were insusceptible to reinoculation; i.e., they had developed an artificial immunity. The blood-serum of such monkeys neutralized the virus *in vitro*, so that intracerebral injections of virus and serum, incubated together for an hour, failed to induce paralysis. Serum injections into the subdural space also prevented infection of the meninges from the nasal mucosa. Normal monkey-serum had no such restraining action. Similar observations have been made by Römer and Joseph,[17] and by Levaditi and Landsteiner,[18] with the serum of recovered monkeys. We seem, therefore, to have in such sero-inoculation a practical means of prophylaxis in the event of the outbreak of an epidemic. The blood-serum of children who have survived an attack of poliomyelitis has also been employed in similar fashion by Flexner and Lewis, who state that, up to the time of writing, the monkeys which had received the mixture of virus and serum were still well, whilst the control-monkeys had succumbed. It is evident that if a therapeutic serum is to be of practical value, it must be employed early in the disease, if possible before, or immediately on, the occurrence of spinal symptoms.

In contrast to these successful experiments is the failure to produce a neutralizing serum in the horse by repeated injections of filtrate. The monkey appears to be the only animal in which the disease can be reproduced and from which a protective serum can be obtained. Such protective monkey-serum should be introduced into the arachnoidal cavity, and in human subjects this would be easily attained by intrathecal injection in the lumbar region.

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PARATYPHOID FEVER. *E. W. Goodall, M.D.*

A report on paratyphoid fever by W. G. Savage[1] has recently been issued by the Local Government Board (England). He investigated 200 cases of actual or suspected enteric fever, and came to the conclusion that from 3 to 3·5 per cent of the cases really suffered from paratyphoid. Clinically the disease is exactly like typhoid, except that it is usually not so serious a one (though it may be fatal). Etiologically it occurs in a sporadic form, and not in epidemics, even limited. Savage also made an investigation into the presence of paratyphoid and allied bacilli in the fæces and urine of persons either healthy or the subjects of various diseases. Apart from the presence of the paratyphoid bacilli in cases of paratyphoid fever, in only one case was an organism found which in every particular was indistinguishable culturally from these bacilli. The bacillus resembled *B. enteritidis* of Gaertner; it occurred in a case of enteric fever, but did not appear to be playing a pathogenic part. Savage, in these and previous investigations, has not been able to find any evidence that Gaertner's bacillus is an inhabitant of the normal human or animal intestine; nor is the paratyphoid bacillus.

Though paratyphoid fever is usually sporadic, it would seem that it may occur epidemically. H. F. Hoskins[2] records an epidemic of thirty-five cases occurring at Weyer's Cave, Virginia, U.S.A., during the spring and summer of 1909. Clinically the cases resembled typhoid fever; but the blood-serum of sixteen of the cases which were tested reacted positively with *Bacillus paratyphosus B*, and not with *B. typhosus*. Several attempts were made to isolate the bacillus from the blood and the stools, but they were all unsuccessful. The illness caused by *Bacillus paratyphosus B* usually closely resembles typhoid fever.

F. A. Bainbridge[3] met with an outbreak, due to *B. paratyphosus B*, of fourteen cases, in which the symptoms were those of acute enteritis, viz., vomiting, diarrhœa, abdominal pain, and collapse. There was also pyrexia lasting from three to seven days. Two of the patients were severely affected; all recovered, though convalescence was tardy. From two of the cases *B. paratyphosus B* was recovered, while the blood-serum of six of the cases clumped this bacillus and also standard strains of the bacillus.

An example, the first recorded, of a paratyphoid "carrier" is recorded by Sacquépée and Bellot.[4] The case was that of a cook in a garrison. He gave rise to nineteen cases amongst the soldiers.

References.—[1]*Rep. of Med. Off. L.G.B.* 1908–09, App. B. No. 4; [2]*Jour. Amer. Med. Assoc.* Mar. 19, 1910; [3]*Brit. Med. Jour.* Nov. 12, 1910; [4]*Progrès Méd.* Jan. 15, 1910, in *Lancet*, Mar. 5, 1910.

PELLAGRA. *J. W. W. Stephens, M.D.*

In treatment, the *Lancet*[1] says that little advance has been made. **Fowler's Solution** has been found to be a remedy of importance not surpassed by any of the new arsenic compounds.

J. H. Hewitt[2] records a case from Virginia, U.S.A., which he considers

is one of pellagra. It had the following symptoms: (1) A persistent diarrhœa, presumably originating from the eating of corn-meal; (2) A symmetrical erythema of certain skin areas, accompanied by severe occipital pain, vertigo, and dizziness; (3) A weak mentality and central nervous system. Cases have also been reported from Maryland and North Carolina.

L. J. Pollock[3] reports fourteen cases from various institutions in Cook County, Illinois. The symptoms were fairly uniform in all, and included stomatitis, dermatitis, and diarrhœa. Besides these, ptyalism, mental symptoms, and refusal to eat were exhibited. It is further pointed out that notable points of difference between the disease in the United States and in Italy are, as regards the former: (1) The overwhelming number of women attacked; (2) The great mortality of the disease; (3) Dermatitis of unexposed portions of the body.

With regard to the skin lesions in pellagra, I. Dyer[4] points out that in no two of his six cases were they alike, e.g., in one case the eruption on the hands might have been taken for a case of blastomycosis, the papillary character of the eruption being quite apparent. Another case had typical "rough skin," with fine scales on the surface; except for the configuration, the absence of itching, and the associated symptoms, a diagnosis of pityriasis rubra pilaris would have been made. A third case resembled vesicular eczema, but could be distinguished by the persistence of the vesicles, the development of papillary areas, and by the marginate, erythematous, *elevated* and *infiltrated* border. All these cases began as an erythematous process differing in no way from ordinary erythema. In others a bullous type is found, and foliaceous forms without vesicles and keratosed fissured eruptions also occur. But the concomitant symptoms enable a diagnosis to be made in these cases. The author regards **Quinine,** the hydrobromide, as the mainstay in treatment.

Discussing the eye-symptoms in fifty-five cases of pellagra in Illinois, C. B. Welton[5] says that the most pronounced of eye symptoms is involvement of the choroid. Paralysis of the eye muscles occurs in a small percentage of cases, and conjunctivitis is not an uncommon symptom. Early-forming cataracts are frequent, also inflammation of the optic nerve and retina. None of these conditions are, however, pathognomonic.

H. Fox[6] mentions the following characteristics of the skin lesions: (1) Symmetry; (2) The sharply circumscribed border, most frequently in the patches upon the neck and hands. In the case of the hands this border is in many cases seen on the back as well as the front. Few of the cases showed pustulation, while fissuring over the knuckles was frequent. From sunburn, the pellagrous eruption—which frequently commences as an erythema—can be distinguished by the marked scaling, in this respect also differing from vitiligo. Squamous eczema is differentiated by the itching, which is almost entirely absent in pellagra. The absence of scaling also separates erythema multiforme.

A Conference[7] on pellagra was held in Columbia, South Carolina, in 1909. F. M. Sandwith stated that the following axioms held good in Italy and Egypt: (1) In districts where no maize is cultivated or habitually eaten, pellagra does not exist; (2) Maize may be cultivated in many districts, and yet there be no pellagra; (3) The disease requires for its production the habitual use of damaged maize. J. W. Thomas considered that corn-bread plays an important part in the causation, but several other observers could find no such influence in their cases. J. W. Morley noticed in his cases ulcers in the ileum which he believed to be pellagrous. With regard to skin lesions, I. W. Faison stated that in the cases he had seen they were entirely absent, and that they are not a necessary manifestation of the disease.

C. G. Manning discussed the nature of the affection known as *Psilosis pigmentosa* in Barbados. The patient begins to refuse food, owing to the tongue being stripped of epithelium, the mucous membrane of the cheeks being reddened. Intractable diarrhœa ensues. Then scurvy patches of dark colour appear on the elbows, knees, and knuckles, later on the feet and hands. Mental symptoms soon follow. The patients soon die unless properly fed and treated. The patches on the ankles, etc., take on a purple-blotched colour, blebs form, and the epithelium strips off; hence the name psilosis. Gangrene also invades the affected skin areas, the skin, muscles, and tendons being involved. Such gangrenous areas occur on the trochanters, sacrum, etc., and a horrible condition ensues, resulting rapidly in death. He considered that a fungus was the cause of this disease, and stated that since all the clothing has been boiled the disease has not spread in the asylum. **Milk Diet** and **Hydrarg. Perchlor.** $\frac{1}{10}$ gr. ter die have given good results. He does not consider that the disease is pellagra.

J. Warnock stated that pellagrous patients in the Abassia Asylum, Cairo, resident there for years and consuming no maize, again develop pellagrous rashes. The rash and diarrhœa occur simultaneously, a sign of a general process, and not owing to exposure to the sun's rays. C. C. Bass has observed complement-fixation (Wassermann reaction) in eight out of sixteen cases; while H. Fox, using the Noguchi modification, obtained a marked positive reaction only in one case, and concludes that pellagra does not often give a positive reaction, and that the reaction, even if positive, is generally weak and easily distinguished from the strong reaction of syphilis and leprosy.

H. P. Cole and C. T. Winthrop, in the treatment of pellagra, used **Transfusion** with marked improvement (see *page* 21). J. J. Watson's experience is that no drug is curative, but he is emphatic that damaged corn produces the disease. J. M. King, on the contrary, records the history of cases in an orphanage which pointed to the disease being communicable. J. J. Watson, reviewing the symptoms of the disease, states that the crowning characteristics of the pellagra eruption are the symmetry and colour. The wet form differs only in degree from the ordinary exfoliative form. It is analogous clinically to a burn of the first degree. As regards digestive disorders, the tongue becomes

exfoliated, and is now, like the buccal cavity, bright red. "Cardinal tongue" is a cardinal symptom of the disease. Frequently the tongue shows (in negroes) bluish-black points—"stipple tongue." Saliva dribbles from the mouth. "Pyrosis is never absent" (Lombroso). Diarrhœa, resisting treatment, occurs sooner or later; and then nervous symptoms.

J. F. Siler and H. T. Nichols[8] summarize their observations on the pellagrous inmates of an asylum in Peoria, Illinois. (1) Attacks were either mild (skin symptoms, digestive symptoms without constitutional reaction) or severe, with marked skin and digestive-tract symptoms, and pronounced toxæmia. (2) A diagnosis of pellagra is not warranted in the absence of skin symptoms. (3) The symmetry of skin symptoms is marked. (4) Digestive disturbances were not always present. (5) Patellar and plantar reflexes were abnormal in three-quarters of the cases (generally increased). (6) The disease appeared to be an intoxication and not an infection. (7) An increase of the large mononuclear leucocytes has not been found.

As regards the etiology of the disease, J. J. Watson[9] found fungi in samples of corn purchased by him in the markets.

J. H. Taylor[10] considers that there is a striking similarity between pellagra, syphilis, and sleeping sickness, especially in the nervous symptoms.

Sambon[11] believes in the protozoon origin, for the following reasons: (1) The total absence or extreme rarity of pellagra in certain places where maize is the staple food. (2) Its presence outside the maize area, and in people who have not eaten maize. (3) The failure of all animal experiments made with maize. (4) The recurrence of symptoms each spring after the removal of the patients from the endemic area. (5) The strict limitation of the disease to field labourers. (6) The similarity of symptoms (skin eruption, late nervous symptoms, anatomical lesions, perivascular infiltration) to those of syphilis and sleeping sickness. (7) The marked increase of mononuclear leucocytes. (8) The favourable action of arsenic. Sambon further believes that the disease is an insect-borne one, viz., by *Simulium sp.* Swarms of these midges appear in early spring, and in autumn they bite in the day-time.

H. Raubitschek[12] records some most interesting facts, whatever may be their bearing on pellagra. He first defines the term "fago pyrismus." By this is understood the pathological effects produced in white and white-spotted animals by feeding on buckwheat (*Polygonum fagopyrum*) and simultaneous exposure to sunlight. These include falling out of the hair, emaciation, and paralytic symptoms. In pellagra it is well known that the skin symptoms occur almost exclusively in the uncovered parts of the skin exposed to sunlight. In buckwheat the active principle is soluble in alcohol. Maize, moreover, is of the corns the richest in fats. Experiments were then conducted on rabbits and guinea-pigs, white and coloured, and on many hundreds of white and coloured mice. One series of cages was exposed to the light, the

other kept in the dark. In each cage of each series white and dark mice were kept. The food used was: (1) Mixed diet, green food, milk, cheese, etc.; (2) Raw or cooked maize, bad or good; (3) Cooked rice. All the animals kept in the dark suffered no injury from any of the diets, but all the white mice that had eaten maize or rice, and which were exposed to the light, died in eight to twenty-one days, after emaciation, staggering symptoms, and paralysis, so that only coloured mice remained. Mice which had shown symptoms in the sunlight recovered on being brought into the dark without change of food.

Cole and Winthrop[13] state that they have obtained recovery with no relapse in certain severe cases of pellagra resisting all forms of medical treatment.

C. C. Bass[14] recommends removal of pellagra patients to a cold climate, or refrigerator treatment.

J. D. Long[15] puts forward the view that the disease is caused by intestinal amœbæ. He found amœbæ in 50 out of 52 cases. He treated 25 cases with **Quinine Sulphate Enemata**, and obtained a cure in 4.

W. Hausmann[16] considers that possibly pellagra may be one of those diseases in which "sensitizers" act upon the organism in such a way that light then produces injurious effects. Thus, hæmatoporphyrin is well borne by mice if they are kept in the dark, but if mice are kept in clear daylight they die in a few hours, with violent inflammatory reaction in the skin. If the light is not so intense and the animals live, œdema, redness, necrosis, falling out of the hair, etc., ensue. To test this view, the author suggests refraining from maize from the month of March onwards. He also suggests the use of cholagogues, as many of these sensitizing substances, such as erythrosin, are eliminated in the bile. Pellagra, it is suggested, may be a "sensibilisations" disease.

REFERENCES.—[1]*Lancet*, Nov. 6, 1909; [2]*Jour. Amer. Med. Assoc.* Oct. 2, 1909; [3]*Ibid.*; [4]*N.Y. Med. Jour.* Nov. 20, 1909; [5]*Jour. Amer. Med. Assoc.* Nov. 19, 1909; [6]*Med. Rec.* Feb. 5, 1910; [7]*Jour. Amer. Med. Assoc.* Nov. 13, 1909; [8]*Med. Rec.* Jan. 15, 1910; [9]*Jour. S. Car. Med. Assoc.* Nov. 1908, in *Med. Rec.* June, 1910; [10]*Ibid.*; [11]*Ibid.* Feb. 1909, in *Med. Rec.* June, 1910, and *Brit. Med. Jour.* Feb. 5, 1910; [12]*Wien. klin. Woch.* June 30, 1910; [13]*Jour. Amer. Med. Assoc.* Ap. 23, 1910; [14]*Ibid.* Sept. 10, 1910; [15]*Ibid.* Aug. 27, 1910; [16]*Wien. klin. Woch.* Sept. 8, 1910.

PELVIC BINDER (The "Open Seat"). *Priestley Leech, M.D., F.R.C.S.*

Dr. Newman,[1] of St. Louis, recommends this form of bandage for operations on the scrotum, testes, and ilio-inguinal region. The diagrams explain its manufacture. Unbleached muslin is used; for the small size one and one-quarter yards, and for the large size one and three-quarters yards, are sufficient. Its advantages are: the patient need not be lifted, he need only be turned on his side to apply the bandage; it is held in place by the spines of the iliac bones, and does not tend to slip; scrotum rests on pubes; urination is not interfered with; easy access to rectum; defæcation does not necessitate a change

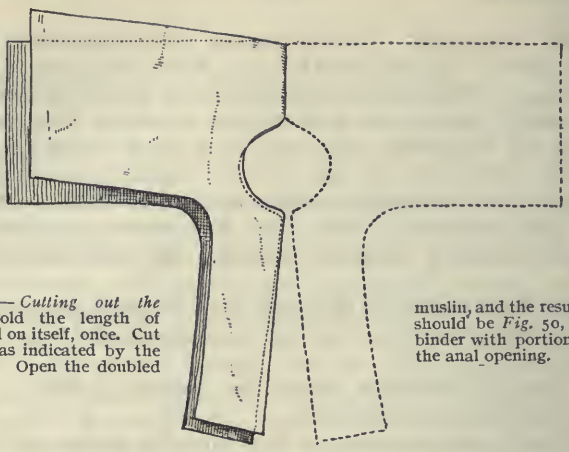

Fig. 50.—*Cutting out the bandage.*—Fold the length of the material on itself, once. Cut the muslin as indicated by the dotted line. Open the doubled muslin, and the resulting pattern should be *Fig.* 50, a two-tailed binder with portion cut out for the anal opening.

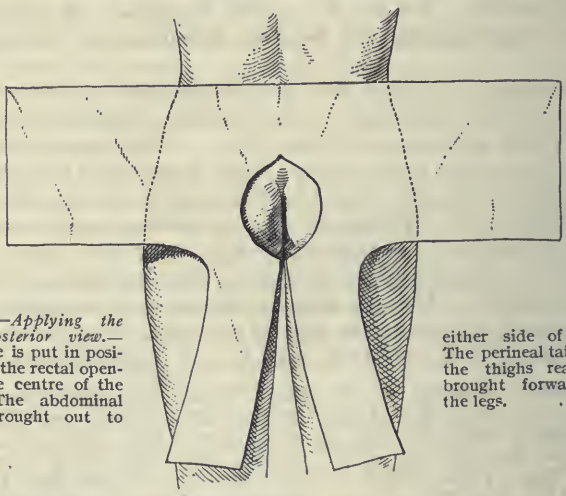

Fig. 51.—*Applying the bandage, posterior view.*—The bandage is put in position so that the rectal opening is in the centre of the bandage. The abdominal ends are brought out to either side of the patient. The perineal tails are under the thighs ready to be brought forward between the legs.

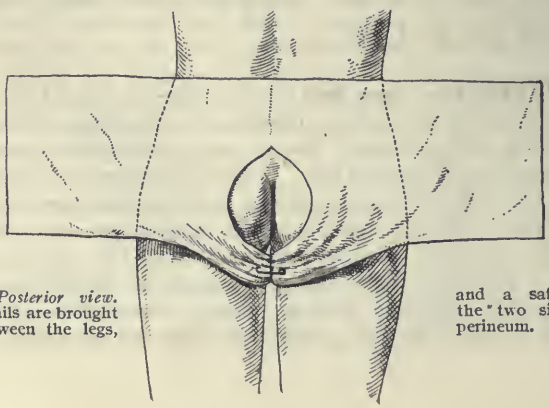

Fig. 52.—*Posterior view.*—The two tails are brought forward between the legs, and a safety-pin locks the two sides over the perineum.

of the bandage; the bandage does not become stringy and see-saw the skin of the entire region; inspection of the wound is easy, and

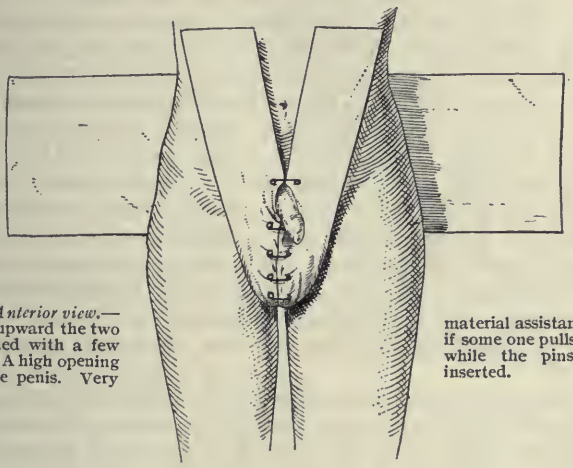

Fig. 53.—Anterior view.—From below upward the two tails are joined with a few safety-pins. A high opening is left for the penis. Very material assistance is gained if some one pulls on the tails while the pins are being inserted.

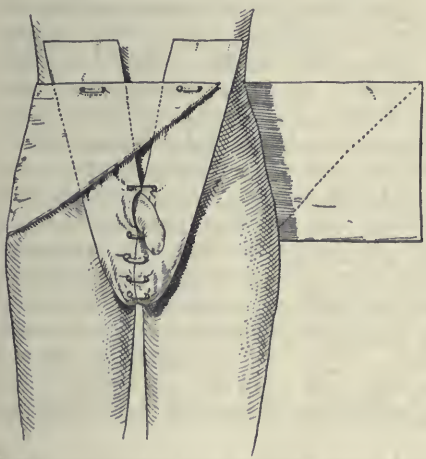

Fig. 54.—One side of the abdominal binder is folded into a triangle, brought across the abdomen, and fastened. The other side is treated in the same way, and any excess of material is turned under.

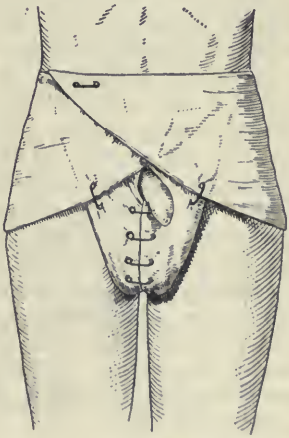

Fig. 55.—The completed bandage.—From below, where the bandage is open, push in a good quantity of cotton to bolster up the scrotum. This raises the part to a high position and protects the wound from contamination.

requires little more than the removal of a few safety-pins. After dressing the wound the same bandage may be re-applied; if the binder is soiled, it is washed and re-used.

REFERENCE.—[1]*Ann. Surg.* Oct. 1909.

PEMPHIGUS. *E. Graham Little, M.D., F.R.C.P.*

Grindon[1] reports an interesting case of fatal pemphigus. The patient was a farmer, aged thirty-three. He had not had any wound or abrasion, and the source of contagion, if any, was not identified. He developed a few blisters about the umbilical area and the right flank. A week later there were about 150 bullæ distributed over the body, and the patient was much worse. He was finally admitted to hospital, where he died nine days after. The bullæ attained a large size—from 4 to 8 inches in diameter ; occasionally a central bulla would be surrounded by smaller satellites, much as in dermatitis herpetiformis. The mucous membrane was extensively affected. Slight rises of temperature were noted towards the end of the case. Appetite was non-existent and sleep possible only in snatches. The blood-count showed eosinophilia ranging from 10 to 19 per cent. The urine was normal, no indicanuria being present. No bacteriological examination is recorded. The patient was treated with continuous baths, which later were given only at intervals.

Pemphigus Foliaceus.—Hazen,[2] working under the direction of Gilchrist, makes a very complete report of a case of this rare disease. The diagnosis rested on the presence of an extremely chronic vesicular eruption, not grouped as in dermatitis herpetiformis, and finally becoming universal, the conjunctivæ being affected (congested) as well. Rises of temperature to 101° were frequent. The vesicles rapidly coalesced, forming large flaccid bullæ which left raw moist eczema-like surfaces. Bacteriological investigation of bullæ, urine, and blood showed in each the presence of *Bacillus pyocyaneus*, which could be isolated in pure culture. In the purulent bullæ *Staphylococcus aureus* was obtained as well. The patient was consequently treated with autogenous vaccines in doses of 10 to 100 million ; these injections were followed by a reaction comparable to that resulting from tuberculin in tuberculous patients, and caused so much discomfort that they were discontinued. Examination of the urine showed a very large proportion of ammonia, ethereal sulphates, and indican, evidence of intestinal putrefaction. Examination of the blood demonstrated leucocytosis with varying differential counts. There was no agglutination to *Bacillus pyocyaneus*. All drugs that were tried seemed useless. The most satisfying treatment was immersion for several hours daily in continuous baths.

Pemphigus foliaceus, since the days of Cazenave, who first described it, has been regarded as a singularly fatal disease ; evidence is accumulating, however, that cases do survive for many years, and even apparently recover. At the November meeting of the Dermatological Section of the Royal Society of Medicine, Dr. Adamson showed a case which had persisted for sixteen years, having been seen at the inception by Dr. Pringle. The patient had maintained a fair degree of general health. I have had a case under my observation, in which the diagnosis was confirmed by Dr. Pringle, for the past eight years ; the skin has become progressively better, and is now practically well.

An excellent coloured plate of this case was published in the last number of the *Medical Annual.*

Pemphigus Neonatorum.—Although the term "pemphigus" is retained for this disease, it has long been accepted that it has no relation to pemphigus, and that it is a simple pus infection of the skin, probably staphylococcal; general septicæmia may result and be fatal. It may be spread by septic manipulations during delivery, and Margaret Smith[3] reports a series of cases occurring in the practice of a single midwife, who had seven cases, of which three proved fatal. The preventive measures taken on discovery of the source of infection were the same as are appropriate for puerperal fever epidemics, namely, suspension of the midwife from work for a time, and thorough disinfection of her clothing, person, and appliances. No other cases occurred after these precautions had been taken. The treatment consists in early and complete asepsis when the bullæ begin to form; probably autogenous vaccines (which were not utilized, the cases being rapidly fatal) might have averted a fatal issue.

Pemphigus Vegetans. — The question whether pemphigus vegetans is rightly included in the group "pemphigus" remains unsettled. Hartzell[4] contributes a timely paper to the elucidation of the nature of the disease, based on the careful observation of a typical case. The patient was a man, aged seventy-six, who showed a bullous eruption, which, beginning on the back of the head, gradually extended to the face, limbs, and extremities, and was localized especially about the axillæ, genitocrural region, and legs. Papillomatous masses were found in the groins and axillæ. The patient died five months after his admission. Histological examination of a bulla showed that the roof consisted of the whole thickness of the epidermis; the contents were composed almost entirely of eosinophile cells, but contained some large round cells of indeterminate character. The papillæ of the corium were much elongated. Comparison with the appearance of the bulla of pemphigus vulgaris showed differences which Hartzell considers "real and important"; in fact, the sole resemblance is that in both diseases the epidermis is entirely separated from the corium in the bullous lesion.

References.—[1]*Jour. Cutan. Dis.* Oct. 1909; [2]*Ibid.* Mar. 1910, p. 120; [3]*Brit. Med. Jour.* Jan. 22, 1910; [4]*Jour. Cutan. Dis.* Mar. 1900, p. 111.

PENIS, INCURVATION OF. *Priestley Leech, M.D., F.R.C.S.*

Whitacre[1] described two cases of what he calls "plastic induration of the corpus cavernosum." In this disease, hard plaques or nodules are found in the corpus cavernosum and in the septum. When the organ is flaccid, it appears perfectly normal; when erect, the plaques lead to a bending of the penis either laterally or upwards. Coitus is rendered impossible; and if a forcible attempt be made to straighten the curve, a fracture of the corpus cavernosum may occur. Whitacre reports two cases on which he operated without success. So far, no method of treatment has been successful. This condition was described

years ago by Jonathan Hutchinson,[2] Paget had described it in 1875, and before him H. J. Johnson described similar cases in 1851. The literature of the subject has been summarized by Neumark and by Hopezansky.[3] The causation is unknown, but supposed to be gouty in origin.

Another form of incurvation is that described by Horwitz,[4] where the curving was due to cicatricial fibrous tissue on the under surface of the penis; the fibrous tissue was resected, with a good result. In this case the fibrous tissue had followed an operation performed for stricture of the urethra. In the first series of cases, excision of the fibrous mass has not relieved the condition.

References.—[1]*N.Y. Med. Jour.* Mar. 19, 1910; [2]*Arch. of Surg.* No. 5; [3]*Wien. klin. Woch.* xxi. No. 10, p. 318; [4]*Ann. Surg.* Ap. 1910.

PERICARDITIS. *Carey F. Coombs, M.D., M.R.C.P.*

Etiology and Pathology.—Wadres[1] records the case of a hitherto healthy girl who, during the eruptive stage of syphilis, developed a pericarditis which recovered completely under vigorous antiluetic treatment.

Brocks and Lippencott[2] summarize the conclusions they have drawn from a study of 150 autopsies of pericarditis. It is usually a secondary complication, not a primary disease. It is important rather as an index of the underlying condition than of itself, except in the suppurative cases. The myocarditis which so often accompanies it is to be referred, not to the pericarditis, but to some causal agent which is responsible for both. They think that pericarditis may be disposed to or determined by independent myocardial degeneration and dilatation, and even by cardiac over-action. Serofibrinous pericarditis is usually the outcome of a general blood infection. Adhesive pericarditis, though a very common lesion, is rarely important clinically. The symptoms associated with it are to be referred to concomitant myocardial and mediastinal disease.

Treatment.—Ortner[3] gives a general survey of pericarditis from the therapeutical standpoint, and advises as follows:—

General.—**Rest** in bed is indicated in all cases, in an upright position if the heart is embarrassed by pericardial or pleural effusion; the patient should remain in bed until no sign of pericarditis remains; a graduated increase in the period of sitting up should be allowed, preferably in the afternoon. For the accompanying myocardial changes, **Graduated Exercise** during convalescence is beneficial; walking on the level is to be tried before inclines are attempted. **Diet** should be as near to the normal as possible in rheumatic cases; in tuberculous cases over-feeding is indicated. In other kinds of pericarditis the possibility of renal lesions should be considered in dieting the patient.

Locally, pain may be relieved by application of **Ice** in bags or compresses; or by heat if cold is not well borne. **Leeches** and **Cupping** are also useful. (For employment of **Methyl Salicylate**, see *page* 49.)

Medicinal treatment should include regular aperients. **Morphia**

(6 to 9 min. hypodermically) may be needed for pain; it should be given with caffeine. **Salicylate of Soda** should be given in rheumatic cases; **Collargol** (Crédé) may be introduced by inunction of 3 grams per day, or by rectal injection of 1 gram per day; or **Electrargol,** 5 grams, may be injected into muscles or veins. For threatening collapse **Digitalis** may be given; or **Strophanthin** in a single dose of ·7 to 1 mgram, half the dose again in twenty-four hours' time if necessary. Other useful stimulants are **Caffeine, Ether, Camphor,** and **Alcohol.** Exudation calls for diuretics, such as **Diuretin, Theocin, Agurin,** or **Euphyllin,** in association with digitalis. If these fail, **Paracentesis** is indicated, especially if there is cyanosis of a threatening degree. The presence of pus or gangrene calls for permanent drainage. In scorbutic and other hæmorrhagic cases the pericardium should not be punctured.

Adherent Pericardium is a subject which is always under discussion. Hess's[4] experiments suggest that when the pericardial sac is obliterated by adhesions the compensatory powers of the movable heart are almost annihilated; the capacity of the liver for storing blood then comes into prominence, and may act as a relief to the heart for months or even years, until its overcharge is followed by anasarca, ascites, and death after a short interval.

Fenton,[5] from a study of 170 autopsy records, has formed some very interesting conclusions. He divides his cases into two groups. (1) Those in whom the adhesions were intrapericardial only; such are found in males more than in females, more in the second half of life; they are due in only a few instances to rheumatism, and are therefore accompanied by valvular disease in a moderate percentage only; these are of no serious import. In the other group there are adhesions without as well as within the sac; these cases are mainly rheumatic, they occur in the earlier decades, and are accompanied by valvular disease and cardiac hypertrophy. In these earlier cases the pericardial adhesions are of great importance. Fenton thinks that the mechanical power of adhesions to hamper the heart has been overestimated, even if we take into account the extrapericardial variety; he believes the great factor in the accompanying cardiac enlargement to be dilatation in the active stage of carditis, when the myocardium is weakened. This is perpetuated, but not caused, by the adhesions which are laid down at the same time. As to the proverbially difficult diagnosis, Fenton lays stress on a readiness for cardiac failure out of proportion to the physical signs, and on enlargement of the heart out of proportion to the valvular disease. He considers Broadbent's sign valuable, but says that well-marked systolic recession may be produced by cardiac enlargement without pericardial adhesion.

West[6] thinks that systolic recession at the apex is suggestive of adherent pericardium, though the absence of this sign is of no diagnostic importance.

Moore[7] thinks there are no definite signs other than that which is very clearly stated by him as a failure on the part of the heart to recover from rheumatic carditis, that is, an abnormal severity and

persistence of symptoms and signs, after the years in which cardiac rheumatism is active have passed. This is especially significant in patients who are known to have had pericarditis.

For cases of adherent pericardium the operation of **Cardiolysis** has been proposed and practised. This is not the place for discussion of technique ; it is enough to say that the principle is resection of some part of the precordial area of bony thorax. Some operators have removed part of the sternum, others content themselves with ablation of costal cartilages or ribs ; in some cases the periosteum has been spared, in others it has been resected. In Britain we may refer to the cases of Poynton and Trotter[8] and Thorburn ;[9] the last-mentioned writer gives an account of all the cases hitherto recorded. A good general review is also found in a paper by Lecéne.[10] The general impression is that in most cases some definite improvement followed the operation. There is, however, room for doubt whether this was due to liberation of the heart from adhesions, the underlying purpose which prompted Brauer to devise the operation, or whether such benefit as has been noted is not rather to be ascribed to expansion of the space available for the movements of an enlarged heart. Morison[11] and Bewley[12] have both submitted patients to operation on this latter score, believing that a hypertrophied heart which has at each systole to lift the resisting thoracic wall, is doing work which hampers it, and which therefore aggravates hypertrophy. In the case of the former at any rate, an instance of aortic regurgitation, very definite improvement followed. If this is so, the operation should be spoken of as thoracostomy rather than cardiolysis ; and the indications for its use become a much simpler matter, for it is virtually impossible to diagnose pericardial adhesion with any degree of certainty.

Pericardial Effusion.—Certain common delusions regarding the nature and frequent occurrence of inflammatory effusion into the pericardial sac should be dispelled by the discussion which took place recently at the Royal Society of Medicine.[13] It was introduced by Dr. Samuel West, whose remarks on the difficulty of DIAGNOSIS were endorsed by other speakers. The signs which have been considered valuable are, as was shown, met with in other conditions, and are caused rather by dilatation of the various cardiac chambers than by distention of the pericardial sac. Most of these signs relate to alterations in the size and shape of the outline of cardiac dullness. Disappearance of the cardiomediastinal notch (Gibson's sign) and of the cardiohepatic notch (Rotch's sign) are due to enlargement of the left and the right auricle respectively ; the dullness at the left base is caused by enlargement of the left ventricle in the absence of any effusion; similarly, that in the left interscapular space, which has been referred to as pathognomonic of pericardial effusion, is really due to enlargement of the left auricle. The fact is, that at one time the rapid enlargement of the heart's dullness which takes place in acute cardiac rheumatism was ascribed to pericardial effusion ; but recent research has proved it due to acute dilatation of the heart under the influence

of myocardial changes. In a word, the "pear-shape" dullness, described as diagnostic of pericardial effusion, really points to another, much commoner, consequence of rheumatic infection of the heart, acute dilatation of the cardiac chambers due to active myocarditis. With regard to other signs, the friction sound of "dry" pericarditis may disappear when fluid collects, but even with large effusions it may still be audible at the base. Muffling of heart sounds may occur in acute carditis when no effusion has formed; it is then due to muscular enfeeblement. The "pulsus paradoxus" is of no value; it occurs apart from pericarditis, and it may be missing in cases of effusion. The one sign on which West is inclined to rely is increase of the cardiac dullness down and to the left, *beyond the point of maximum impulse*. In the discussion, many interesting points were raised, among them the value of orthodiagraphy in the diagnosis of effusion. Ironside Bruce noted in two cases a globular non-pulsatile cardiac shadow with sharp edges. This is confirmed by Rosenfeld,[14] who speaks of a clearly-defined triangular shadow formed by the effusion, in the midst of which lies the darker shadow of the heart itself. Pasteur in two cases found an immobilized diaphragm by means of the *x*-ray screen.

Auenbrugger's sign, a pulsatile bulge in the epigastrium, may be of use in diagnosis when it is present. Broadbent in one case found that the rightward limit of cardiac dullness altered with change of posture; and Ogle has noted non-pulsatile distention of the jugular veins. Another point of some diagnostic importance came out in the discussion, namely, the extreme rarity of large effusions in cardiac rheumatism; indeed, both Lees and Poynton, whose wide experience and close study of such cases gives the greatest weight to their opinion, each said that he had never yet seen a case of pericardial effusion large enough for paracentesis, as a result of rheumatic infection. If such difficulties present themselves in the diagnosis of large effusions of the serous kind, much more are they found in detecting pus in the pericardium, as this is usually present in small amounts only. (See below, "Pyopericardium.")

Treatment.—In pericardial effusion, West advises **Paracentesis,** in the fifth or sixth left space, outside the left vertical nipple line, but within the limit of cardiac dullness. If, on account of purulent effusion, drainage is necessary, the same spot is to be preferred for the permanent opening. Ogle spoke in favour of transdiaphragmatic drainage through an epigastric incision. Ortner[3] gives very specific directions. He advocates puncture at the same spot, which should be dull but not pulsating. The skin having been cleaned, an exploratory puncture should be made, the needle pointing to the right towards the apex beat. If the result be positive, paracentesis should be practised, Curschmann's (flat) trocar and cannula being used. The fluid should be withdrawn slowly, by syphon action; not more than 1000 cc. should be extracted, and removal of this amount will give immediate relief. If the exudate is shut off in the right side of the sac, puncture through the right parasternal line in the fourth or fifth space is indicated.

Venus[15] found that of 93 recorded cases of paracentesis pericardii, 58 died; of 49 cases of pericardial drainage without resection of rib, 26 died; of 36 cases of drainage for which rib was resected, 16 died. Allowing for differences in the gravity of the three groups of cases, this points to some slight advantage accruing from a free drainage of the sac.

Pyopericardium.—The limitations of our present knowledge of this important subject are defined in Poynton's admirable article.[16] The *causation* is of three kinds: (1) Pneumococcal, the largest group in children under twelve; (2) Pyæmic, as in osteomyelitis, etc.; (3) Tuberculous. Of these cases, 83 per cent were fatal before the end of the fourth year of life; in 60 per cent empyema was associated, though in all probability such an association is not due to direct infection from pleura to pericardium, but to blood-borne infection. In only 6 out of 100 cases was a correct diagnosis made; in 2 of these friction was heard. This difficulty is due to the occurrence of the disease in children, to its association with a lesion (empyema) which seems at first at any rate to account satisfactorily for all the symptoms, and to the absence of any definitely diagnostic physical sign. As to symptoms (speaking now of the pneumococcal form), the course may be acute, subacute, or chronic. The patient is very ill and livid, panting for breath, orthopnœic with syncopal attacks; the temperature is irregularly febrile. The physical signs are, of course, often obscured by the concomitant empyema. Poynton calls attention to the following: muffling of the heart sounds, dullness over the precordium sharply limited from resonance, sometimes reaching towards or to the left clavicle, and sometimes present in the interscapular region with tubular breathing or diminished air-entry in the same area, and diffuse wavy pulsation to the right of the sternum. The prognosis, even in the few cases in which an early diagnosis is possible, is always grave. The treatment should be surgical: exploration first, either at the left lower limit of cardiac dullness as advised by West and Ortner, or at the inner ends of the fourth and fifth left spaces; then drainage, if pus be found. Even so, however, pneumococcal pus is often too thick to drain freely.

References.—[1]*Wien. klin. Woch.* 1909, No. 3; [2]*Amer. Jour. Med. Sci.* Dec. 1909; [3]*Deut. med. Woch.* May 19, 1910; [4]*Münch. med. Woch.* Jan. 11, 1910; [5]*Pract.* Nov. 1908; [6]*Clin. Jour.* May 25, 1910; [7]*Lancet,* July 23, 1910; [8]*Ibid.* June 19, 1909; [9]*Brit. Med. Jour.* Jan. 1, 1910; [10]*Arch. des Mal. de Cœur, etc.* 1909, ii. 673; [11]*Lancet* July 14, 1908; [12]*Brit. Med. Jour.* Ap. 16, 1910; [13]*Proc. Roy. Soc. Med.* 1909 (Med. Sect.), pp. 55, 77; [14]*Dissert. Berl.* 1909, quoted in *Münch. med. Woch.* May 24, 1910; [15]*Med. Press,* Nov. 11, 1908; [16]*Brit. Med. Jour.* Aug. 15, 1908.

PERITONEUM, SURGERY OF.

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A number of valuable contributions to the subject of diffuse peritonitis during the year demonstrate that interest in this important question is not waning.

"The Abdominal Watersheds, and their Influence on the Localization of Intra-peritoneal Infection," is the title of a well-considered

address by C. R. Box.[1] The bony prominences of the abdomen and the various mesenteries and folds formed by the peritoneum itself are considered in relation to the points of predilection of purulent abdominal collections and the direction of spread of peritoneal inflammations and exudates. The article is too condensed to admit of successful summary, and will well repay perusal.

Gerster[2] analyzes the cases of free progressive peritonitis, 609 in all, which were admitted to the surgical division of the Mt. Sinai Hospital of New York, during a period of nine years and six months beginning May 1, 1899, and ending Dec. 1, 1908. Of these, 461 were caused by appendicitis, while only 148 were due to injuries and affections of the viscera. Diffuse peritonitis was encountered in 17 per cent of all cases of appendicitis. A discussion is given of that fruitful thème of surgical polemics, the factors which justify the classification of a given case under the above heading. As Gerster remarks, the ascertainment of the degree of diffuseness is, and will remain, the weak link in the diagnostic chain, and to what extent the varying statistics of different operators may be due to a different interpretation of this condition may well be questioned. He demands the presence of the classical symptoms of peritonitis in addition to the demonstration of turbid sero-purulent or frankly purulent exudate under pressure in all the accessible parts of the peritoneal cavity. These requirements are, however, open to the same variability of the personal equation, and do not allow for those exceptionally severe cases of dry peritonitis usually streptococcic in origin.

Except where death was imminent, the rule was to operate in every case as soon as possible. It is interesting to note the changes in operative methods which have occurred during the period of years covered by this report, and to observe the lowering of mortality. In the early years there were multiple incisions, more or less complete eventration, sponging, irrigation, and a complicated system of drainage by tubing and packing. Gradually operative measures have dwindled to the removal or repair of the focus of infection and the insertion of drainage to the site of the major pus collection, and, if necessary, into the pelvis. The following table shows the results at a glance :—

Year	Totals	Cured	Died	Percentage of Mortality
1899	38	8	30	79·0
1900	45	21	24	53·3
1901	32	21	11	34·3
1902	29	17	12	41·4
1903	40	28	12	30·0
1904	38	27	11	29·0
1905	45	32	13	28·8
1906	68	56	12	17·6
1907	64	55	9	14·5
1908	62	53	9	14·0
	461	318	143	31·0

Fowler's position was used during the latter half of the period. Pelvic abscesses were no more numerous during this time, but curiously enough, out of ten complicating subphrenic abscesses eight were observed since 1905.

A synopsis of the results of treatment of peritonitis from other causes than appendicitis is appended, and is of statistical interest.

Excellent systematic articles upon diffuse peritonitis are contributed by Federmann[3] and Deaver.[4] The essential treatment of peritonitis is summed up by the latter as follows: (1) Early operation; (2) Light anæsthesia; (3) Rapidity and simplicity of operation; (4) Excision, repair, or exclusion of original focus of inflammation; (5) Avoidance of flushing and evisceration; (6) Proper drainage; (7) Simple post-operative treatment by position and proctoclysis with predigested beef added in small quantities to the saline solution for the purpose of nutrition. With this treatment he reports sixty-three cases of diffuse peritonitis operated upon within the first forty hours of the disease, in which there was but one death (1·5 per cent). His practice in that difficult class of cases which, after an illness usually of more than forty hours, show marked signs and symptoms of diffuse peritonitis, is given as follows:—

"My practice in these cases, when ill more than forty to fifty hours, as to operation, depends upon the presence or absence of some definite localizing sign of the original seat of the peritonitis. When the patient's abdomen is uniformly rigid or uniformly distended, and I cannot detect any point of excruciating tenderness in the right iliac fossa, flank, or loin, and the appendix cannot be located in the pelvis by rectal or vaginal examination, I do not operate; I treat such cases by the Ochsner method, supplemented by proctoclysis as practised by Murphy. As soon as a well-localized area of rigidity and tenderness is well marked, and the evidence of peritoneal irritation is practically subsided, operation offers a much greater percentage of recoveries than in the stage immediately preceding this condition. The situation of the localized focus is of importance. We may have it toward the flank, loin, or pelvis, and then localization and disappearance of peritoneal irritation will be much more rapid and complete than when it is toward the median line. In fact, in the latter instances delay is absolutely essential. In peritonitis of the upper abdomen our course of procedure must be somewhat different, depending upon the source of the lesion. To make myself thoroughly understood I will individualize. Peritonitis due to gastric, duodenal, intestinal perforation, rupture of the gall-bladder, liver, or spleen must be operated as soon as the patient is seen if any chance of recovery is to be offered. Acute peritonitis due to pancreatitis should not, in my judgment, be subjected to immediate operation if the best results are to be obtained, nor peritonitis the result of gall-bladder inflammations, excluding rupture of the healthy organ, gangrene, and ulcerative perforation. Peritonitis of the lower abdomen, other than that due to appendicitis and acute pyosalpinx, should be operated at the earliest possible

moment to obtain the best results. In cases of less than forty-eight hours' duration we operate immediately."

Federmann highly praises the value of the leucocyte count in prognosis. "The last, and perhaps the most important, of the general symptoms, and at the same time the most valuable prognostic sign, is the condition of the leucocytes. It happened to me first to determine a certain regular course of leucocytosis in acute peritonitis. Hundreds of cases that have been examined have confirmed this. In my opinion, apparent irregularities cannot alter the value of this symptom, for the cause of them does not lie in the method, but in the variability of the disease lying at the bottom of them. Every diffuse peritonitis sets in with a high leucocytosis—over 20,000—which remains at this height or rises even higher so long as the resisting power of the organism is good, but sinks the more rapidly the more the general intoxication comes to the front. Thus, under certain circumstances in perforation of the stomach a subnormal number of leucocytes of 6,000 may be observed after only twenty hours. A high leucocytosis is always, therefore, a sign of a grave infection, but at the same time is to be looked upon as a favourable prognostic sign, whilst a low leucocytosis with severe clinical symptoms almost allows of a lethal prognosis." He asserts that he has never seen a case of diffuse peritonitis showing a falling leucocyte count that recovered under immediate operation, and advocates delay in such an event. He makes no mention of the significance of a high percentage of polymorphonuclears, which by some American surgeons is claimed to give a good index of the degree of toxæmia, and secondarily to the prognosis.

Ten consecutive cases of acute general or perforative peritonitis are reported by Jeans.[5] The method was approximately that summarized above, with certain alterations according to circumstances. There were two duodenal perforations, both of which cases recovered. The remainder were due to appendicitis. Two died: one of pneumonia, in spite of an apparently satisfactory abdominal condition. He calls attention to a sign which was present in two cases, in one of which it led him to operate at once upon a gangrenous appendix in which the symptoms were masked, as happens not infrequently after gangrene has occurred. This was the presence of reversed respiratory movements of the abdomen, i.e., retraction during inspiration, and vice versa. This is attributed to the effort to prevent the viscera from moving upon each other.

The great value of normal saline solution in the pre- and post-operative treatment of peritonitis is lauded by all. In general the method of Murphy is preferred for administration. Occasions still arise when it is best given intravenously or beneath the skin. Allaben[6] and E. W. Hey Groves[7] advocate a trial of a fourth method—the institution of an appendicostomy at the time of operation. Groves' conclusions are as follows: "(1) The value of appendicostomy in acute diffuse peritonitis is very great in these respects: (*a*) It serves to introduce saline fluid at will in almost any quantity after the

operation ; (*b*) This introduction is more likely to be efficient than if given by the rectum, especially in children ; (*c*) It is less disagreeable to the patient, and involves less exposure and moving than does rectal infusion ; (*d*) It serves as a ready means of washing out the large intestine, and so relieving pain, distention, and the retention of toxic intestinal contents. (2) It is rather a quicker and simpler operation than removal of the appendix. (3) The smallest possible piece of the appendix should be retained : enough to preserve the sphincter at its base, and no more. (4) It is better not to tie in a tube, but to reinsert this whenever necessary."

Of Allaben's two cases, one recovered satisfactorily, the other died after five weeks of pylephlebitis. Groves reports four cases with two deaths. The mortality itself is not reassuring, and the value of this method must be content for the present at least with the Scottish verdict, " not proven."

Hirschel[8] gives a second report upon the use of 1 per cent camphorated oil in diffuse suppurative peritonitis. The method was employed only in the most desperate type of cases. After appropriate treatment of the focus of infection, the pus was aspirated or wiped away, and 100 to 300 grams of camphorated oil smeared over intestines and peritoneum. The immediate stimulatory effect was marked, and five out of nine cases recovered. From these results Hirschel recommends its use in the most severe cases.

A timely article is contributed by Ochsner[9] concerning the prevention and inhibition of peritonitis, with especial reference to the harm done by cathartics in incipient peritonitis. The following excerpts are self-explanatory : " Prevention must depend largely upon a careful early diagnosis, and inhibition upon early treatment in cases in which a circumscribed or a beginning diffuse peritonitis exists when the patient comes under the physician's care, by definitely planned methods which will prevent diffusing septic material from its circumscribed location to other portions of the peritoneal cavity. . . . Medical literature shows absolutely that there is no form of treatment of much use in peritonitis which is so far advanced that the patient is suffering to a marked degree from general sepsis. We might as well think of saving a wooden building after fire has partly destroyed all of the walls and floors. It is unreasonable to expect good results under these conditions. . . . By giving a cathartic for acute indigestion without a physical examination in a case of gangrenous appendicitis, he (the physician) may cause a distribution of the infectious material over the entire peritoneal cavity by stimulating peristalsis, producing a diffuse peritonitis. . . . Undoubtedly many patients lose their lives from general peritonitis because they are given either cathartics or food or both by mouth after the beginning of the peritoneal infection. In a large number of cases which have come under my personal observation, there has not been a single case of death from peritonitis in which neither cathartics nor food had been given by mouth after the beginning of the attack."

Preparation and After-treatment of Abdominal Operations.—Explicit instructions as to many details of preparation for abdominal operations are given by H. J. Paterson.[10] He considers three days the minimum period for preparation, and prefers a week. During this time special care is given to the mouth, the patient is kept on a fluid diet, and several calomel purges are administered before the final purge, which is effected by castor oil, the day before operation.

The skin of the operative area is prepared as follows: Two nights previous to the operation the pubes is shaved, and the patient takes a hot bath. If the patient be too ill for a bath, the abdomen is washed over with acetone. On the night previous to the operation the *whole* abdomen is well rubbed over for five minutes with acetone, and then swabbed over with iodine paint. This paint is made up as follows:—

℞ Liq. Iodi Fort.	℥j	Aq. Dest.	℥j
Spt. Vini Meth.	℥ij		

The whole abdomen is then covered with a dry sterilized sheet of gauze or lint, kept in place by a bandage. As soon as the patient is placed on the operation-table the bandage is removed, and while he is being anæsthetized the whole abdomen is again painted over with iodine paint.

The open method of administration of ether is preferred for anæsthesia.

When the patient is returned to bed, he should be placed on his back, but it is not necessary or advisable to keep him in this position. The Fowler position is warmly recommended after all abdominal sections, whether complicated by peritonitis or not. The lateral position also may be freely used. Mansell Moullin[11] also makes a special communication to the subject of position after operation, in which he states that a continuance of the dorsal position for any length of time is unnecessary and causes troublesome backache. The right or left lateral position, according to the operation, is commended.

Paterson employs continuous rectal saline injection after all abdominal sections. He advises early and liberal feeding even after operations upon the stomach, and, without giving definite rules, he regards the early opening of the bowels as one of the most important points in the treatment of peritonitis after abdominal operations.

Torsion of the Great Omentum is the subject of communications by Luckett,[12] Griffiths,[13] and Steiner.[14] Each reports a single case. Two presented the usual association with a hernia causing adhesion at one of the lower angles of the omentum, while in the third case the fixed point was due to adhesions in the region of the cæcum, possibly due to old appendicitis, though no history of this was obtained. All the patients recovered after operation.

Talma's operation has been employed by Benno Credé[15] in five instances. In two there was no result, in two there was a considerable improvement for six and eight months respectively, and in the last case, in which, as the result of his previous experience, he made a much larger denudation of omental and parietal peritoneum, the result

is very gratifying after six months. He believes that results would make the operation well worth while in this type of cases if they were treated more radically, as in his last case.

REFERENCES.—[1]*Lancet*, Mar. 26, 1910; [2]*Ann. Surg.* Ap. 1910; [3]*Med. Press*, Nov. 17, 1909; [4]*Ann. Surg.* Dec. 1909; [5]*Liver. Med.-Chir. Jour.* Jan. 1910; [6]*Jour. Amer. Med. Assoc.* Mar. 19, 1910; [7]*Ann. Surg.* Dec. 1909; [8]*Münch. med. Woch.* Ap. 12, 1910; [9]*Bost. Med. and Surg. Jour.* Feb. 10, 1910; [10]*Pract.* Mar. 1910; [11]*Clin. Jour.* Mar. 16, 1910; [12]*Jour. Amer. Med. Assoc.* Ap. 23, 1910; [13]*Amer. Jour. Med. Sci.* July, 1910; [14]*Deut. med. Woch. July* 14, 1910; [15]*Berl. klin. Woch. May* 2, 1910.

PERTUSSIS. *Prof. G. F. Still, M.D.*

Whooping-cough is to be classified, says Thursfield,[1] rather as a general than as a local infection, and many of its complications are best explained as due to toxins. The infection is most easily spread in the early catarrhal stage before the whoop is heard, but cases are on record which seem to show that it may spread even after the whooping has ceased.

The nature of the virus is perhaps not yet determined, although Bordet[2] regards the specificity of the bacillus described by himself and Gengou as beyond doubt. In direct opposition to the view just quoted as to the extent of the infection, Bordet says that whooping-cough, like diphtheria, is a localized infection; it grows in a definite area, hardly spreads at all, and in particular never reaches the blood. The bacterium of whooping-cough, according to Bordet, is a small cocco-bacillus, comparable in size and shape to the influenza bacillus. It grows chiefly in the parts below the larynx, not in the mucus of the nose and throat, and therefore is best obtained from the viscid mucus expectorated from the bronchial tubes at the end of a paroxysm of whooping. Bordet and Gengou have isolated an endotoxin from this bacterium which, when inoculated under the skin, produces wide-spread necrosis; they suppose that a similar process may occur in the lining membrane of the bronchi when the bacterium is present there in large numbers, and hence the severe paroxysm of coughing. Freeman[3] regards the specificity of Bordet's bacillus as strongly confirmed by its agglutination by the serum of children with whooping-cough.

Thursfield (loc. cit.) points out that whilst the disease very rarely occurs twice in the same individual, it may do so, and in old age people who have escaped the disease all their lives fall an easy prey to it. Sucklings very rarely take the disease, but when the mother has pertussis at the time of birth, the infant usually takes it; this difference is supposed to indicate a possible conveyance of immunity to the child from the mother who has previously had the disease, and is therefore herself immune.

Leucocytosis is present in the majority of cases. It consists chiefly in an increase of lymphocytes, and may be noticeable even in the catarrhal stage before the whoop is present, so that it may be of some value for diagnosis. It is said also to be more marked when the case

is severe, and to be thus of some value for prognosis. Dr. Hugh Ashby[4] found a leucocytosis of 15,000 to 30,000 white cells per cmm., and in nearly every case the lymphocytes formed about 60 per cent of the white cells. Whooping-cough may occur without whooping, as is distinctly noticeable in some epidemics.

Complications.—Bronchopneumonia is the most serious and the most frequent, and Thursfield points out that in infants the preliminary catarrhal stage may pass straight into a bronchopneumonia which kills the infant without evidence of pertussis appearing. Empyema is less frequent with whooping-cough than with measles. Bronchiectasis is, according to the same writer, not infrequently due to whooping-cough, and the relation is not always recognized, because there is often a period of comparatively good health intervening between the whooping-cough and the onset of the symptoms which lead to the diagnosis of bronchiectasis. Tuberculosis, which is so often found at autopsies on children dead from whooping-cough, is perhaps mostly antecedent to the pertussis, and is only stirred into greater activity by this disease. It is easy to mistake the protracted bronchopneumonia of whooping-cough for an acute tuberculosis. The various hæmorrhages which occur are of little gravity usually, but severe epistaxis may cause profound anæmia.

Diagnosis.—Cushing[5] considers that the leucocytosis of pertussis is as invariable as the leucopenia of typhoid, and that the blood ought to be examined in every case where there is any doubt as to the nature of a cough in childhood. He mentions a case which had been regarded as one of "tracheitis," without recognition of its nature; commoner is the confusion between whooping-cough and tuberculosis of the mediastinal glands, or foreign body in a bronchus.

Treatment.—Cushing (loc. cit.) says that **Rest in Bed** usually at once lessens the almost incessant cough which is frequent during the first fortnight of pertussis. The windows are to be widely open, even in winter; the cold fresh air of a winter night is a good sedative for the cough of pertussis; the special frequency of the paroxysms at night is due entirely, so Cushing says, to vitiated air in the sleeping-room. Motor-riding is to be forbidden, as the dust and rapid air currents tend to excite the cough. Vomiting may be reduced by **Kilmer's Belt,** for which a band of linen is used 4 to 5 inches wide and 3 inches less in length than the circumference of the child's abdomen at the navel, with two strips of elastic webbing each two inches wide let in at each side, the whole belt lacing at the back. This should be worn night and day, and should be tight enough to afford firm support to the abdomen.

The most useful drugs in Cushing's experience are **Belladonna, Antipyrin, Heroin, Paregoric,** and **Dover's Powder.** At first belladonna is given after each meal in small doses, and a dose of heroin at bedtime. The belladonna is to be gradually increased, and its beneficial effect is not obtained until it produces distinct flushing of the cheeks. Cunnington[6] recommends **Benzol** in doses of 1 min. in syrup for the

chronic paroxysmal stage ; he thinks also that the **Cresoline** lamp is valuable both as a sedative and as an antiseptic.

Eulatin is recommended by Baedeker; [7] it is a compound of amido-benzoic and bromo-benzoic acid with antipyrin. A child of four years will take about 3 gr. daily, and a child of eighteen months half this amount in three doses. This drug is said to be unirritating to the stomach ; it does not cause loss of appetite or diarrhœa ; it is a whitish powder of slightly acid, not unpleasant taste, and can be obtained in the form of tablets. A striking effect of this drug was the rapid diminution and often cessation of vomiting ; the paroxysms of whooping are also diminished in number. **Thiocol** is another proprietary preparation which has been recommended for whooping-cough ; it is a form of guaiacol, is soluble in water, and though not pleasant to taste, is much less unpleasant than creosote, to which it is closely allied.

Thursfield (loc. cit.) states that the best of the tonic and possibly bactericidal drugs in this disease is **Quinine ;** but unfortunately this is a difficult drug to administer to children on account of its bitter taste.

Mechanical methods of treating whooping-cough are described from time to time, but for simplicity it would be hard to surpass that advised by Abrams ;[8] of its success further evidence is required. A pleximeter is to be placed on the spinous process of the seventh cervical vertebra, and is to be struck several times as strongly as the child can bear without flinching ; the number of blows is unimportant. In the absence of this apparatus a strip of linoleum, between which and the skin a little cotton may be placed, may be used as a pleximeter, while the **Percussion** is done with a small hammer. The blows are to be repeated for a period of five minutes thrice daily. Abrams states that this treatment has arrested the paroxysms of whooping-cough in a number of patients in from three to seven days.

REFERENCES.—[1]*Pract.* Oct. 1909 ; [2]*Brit. Med. Jour.* Oct. 9, 1909 ; [3]*Ibid* ; [4]*Ibid.* May 7, 1910 ; [5]*Cleveland Med. Jour.* Nov. 1909 ; [6]*Hosp.* Jan. 22, 1910 ; [7]*Ther. Monats.* Sept. 1909, in *Brit. Med. Jour.* Jan. 1, 1910 ; [8]*Ther. Gaz.* Ap. 15, 1910.

E. W. Goodall, M.D.

Biehler[1] has tried **Fluoroform** in 232 cases of whooping-cough. The dosage was as follows : During the first year 10 to 15 min. three times a day, and 5 to 10 min. after each attack of coughing, up to 250 min. in the twenty-four hours. In children of two to three years, 20 to 25 min. were given three times a day, and after each attack as many minims as the years of the child's age. Fluoroform water can be given safely in large doses even to infants, and if the desired effect is not obtained soon, the dose should be increased. According to the writer, the results were very gratifying.

(For the use of **Bromoform,** see *page* 22 ; for **Neraltein,** *page* 42.)

REFERENCE.—[1]*Arch. de Méd. des Enf.* July, 1910, in *Brit. Med. Jour.* Epit. Sept. 17, 1910.

PHLEBOTOMUS FEVER. *J. W. W. Stephens, M.D.*

C. Birt[1] gives an historical and scientific summary of our knowledge of this disease as observed in Malta and Crete. In Crete it was popularly called "pink-eye."

Seasonal Prevalence.—Is well marked in June, though there may be cases in the earlier months; reaches a maximum in July, though continuing well marked into October.

Onset.—Is sudden, with chilliness, nausea, headache, discomfort and heaviness about the eyes, lumbar pain, and somnolence. The patient goes to bed. Temperature 101° to 102° F.; pulse slow, 70 to 80; face flushed, eyes suffused and heavy. In the evening the temperature may be 103°, but there is no corresponding increase in the pulse-rate. The temperature falls 2° next morning, and convalescence is rapid.

Nervous Symptoms.—Drowsiness severe; frontal headache; sometimes tenderness along the nerves.

Eyes.—Injection of the conjunctiva is marked. The eyes do not water.

Digestive System.—The tongue has a thin white fur except at the edges. Nausea is frequent. Vomiting is an early symptom in a quarter of the cases. Constipation commonly occurs, and diarrhœa in a fifth of the cases.

Vascular System, etc.—A slow pulse is characteristic, e.g., as low as 40, or under 90, with a temperature approaching 105° F. Spleen is not enlarged.

Skin.—Is usually dry, but there may be sweating. The capillaries of the face are often much dilated, producing puffy eyelids and features—a dissipated look.

Muscles.—Stiffness and pain in the back and calves of the legs are nearly always present: increased by motion.

Duration of Fever.—In 30 per cent of the cases it lasts three days, while in 2 per cent it lasts eight days. Second attacks occurred in 6 per cent of cases.

Sequelæ.—Every case has recovered, and there are no bad after-effects.

Relation to Phlebotomus sp.—[There are three, if not four, species of phlebotomus in Malta, but the common one appears to be *P. papatasii*. —J. W. W. S.] This fly appears in April and May, increasing in number as the summer advances. There is an evident relationship between the distribution of the fly and the fever. [As more than one species occurs, it is impossible to say to which the author's statement applies, or whether to all.—J. W. W. S.] They settle in dark corners in the daytime, especially on clothing. They are attracted by the human body smell. They prefer whitewashed walls, and avoid painted ones. As regards breeding-places, all kinds of situations were examined, but with negative result. [Larvæ have since been found in cracks in walls, but only very few.—J. W. W. S.]

Experimental Transmission.—Experiments were made on volunteers which showed: (1) That the blood is infective during the first day of

the fever; (2) That *P. papatasii* (? species) can convey the infection; (3) That they become infective seven days after biting, and that they remain infective for ten days after biting, but whether longer it is impossible to say, as the flies do not live in captivity; (4) The incubation period is three days sixteen hours to seven days; (5) Transmission also occurs by direct inoculation of blood; (6) The virus can pass through a Pasteur-Chamberland candle "F."

The disease in Malta appears to be less severe than that in Herzegovina and Dalmatia.

R. Doerr and V. K. Russ[2] point out that the blood ceases to be infective forty-eight hours after the commencement of the attack, so that isolation is unnecessary after this period. They point out the close resemblance to yellow fever; (1) The virus of both passes through filters; (2) Both are conveyed by flies; (3) In yellow fever, hæmorrhages, diarrhœa, and black vomit do not occur during the first three days, i.e., when the virus is circulating through the blood; and Franz, in Dalmatia, who frequently records epistaxis and diarrhœa, states that these do not occur until the end of the second day, when the virus has disappeared from the blood. The destruction of the virus appears to set free toxins which produce these symptoms. Animals have not so far been infected with phlebotomus fever. The authors consider that the disease is transmissible through the young brood of flies, as all adults die in winter, and no relapses or fresh cases occur in winter or spring. In yellow fever a similar transmission is alleged.

REFERENCES.—[1]*Jour. R.A.M.C.* Feb. 1910; [2]*Arch. f. Schiffs u. Trop. Hyg.* Nov. 2, 1909, in *Jour. R.A.M.C.* Feb. 1910.

PHTHISIS.

Soamin in (*page* 13); **Eucalyptol-Menthol** in (*page* 28); **Pantopon,** for relief of cough (*page* 43).

PHTHISIS IN CHILDREN. *Joseph J. Perkins, M.B., F.R.C.P.*

In reviewing the frequency of phthisis in childhood, a subject on which there is a marked discrepancy of opinion between British and Continental observers, and indeed among British observers, Riviere[1] is careful to postulate that by phthisis he means the clinical condition, with the signs and course, to which the name has been commonly applied in the adult. He does not include the other forms of pulmonary tuberculosis which are more frequent in childhood than is phthisis proper. He brings to the investigation of the subject the experience of a large children's hospital and of a chest hospital, both in the East End of London, so that it is evident but little can escape his net. The Registrar General's returns reveal a great mortality from tuberculosis below the age of five years, but between the ages of five and twenty—the period of school life—the mortality from this cause is lower than for any corresponding period of life. Mortality per 1,000,000 living in London, 1903–7: Under 5 years, 3,788; 5 upwards, 766; 20 upwards, 1,970; 40 upwards, 3,313; 60 upwards, 2,313; 80 upwards, 977.

The acute and fatal forms of early childhood are, in Riviere's opinion, due to intestinal infection, the bacilli which have escaped the mesenteric glands invading the lung in its lower parts as a rule, and thence reaching the bronchial and tracheal glands. By the time school age is reached, this form of disease is largely left behind, and the tuberculosis of school life will be divided between tuberculosis of the thoracic glands in a limited degree and phthisis. The former group he considers to be a considerable one, but though its presence may be suspected, conclusive proof is difficult or impossible. The only evidence of its frequency is to be obtained from post-mortems on children dying of some acute disease. Such records show tuberculosis of the thoracic glands to be present in some 20 or 25 per cent.

Turning to phthisis proper, a condition to be diagnosed by physical signs, we find the majority of British observers in marked agreement in placing the proportion at something under 0·5 per cent. The conditions which Riviere considers to be the most fruitful sources of error, and likely to be confounded with phthisis, are: (1) Physiological conditions, especially blowing breath-sounds at the right apex in thin children. (2) Adenoids when associated with bronchitis, in which condition collapse of some standing not infrequently occurs and simulates tuberculous consolidation. (3) Bronchitis with signs confined to the roots, and sometimes both apices of the lungs, with or without temporary collapse. (4) Conditions of bronchiectasis with or without fibrosis, especially where a whole lung is involved up to the apex. Where, as occasionally occurs, the apex *only* is involved, the condition may be very difficult of diagnosis. (5) Wasting conditions not dependent on tuberculosis, and especially the condition of wasting and pallor accompanying carbohydrate dyspepsia in children. (6) Tuberculosis spreading from tuberculous thoracic glands, though here the diagnosis is of less importance than in the conditions already mentioned.

In his own hospital experience he has been struck by the rarity of phthisis in children as compared with the adult. His out-patient notes for four years show 31 cases in children as against 1165 in adults (2·6 per cent). If phthisis were as rife at school age as in later life, 24 per cent of the cases should occur between those years instead of 3 per cent. Incidentally he mentions that from his experience he feels sure that the number of cases in which cure occurs at an early stage are considerable. Signs may be left, and no doubt some of these cases of arrested tubercle, when discovered incidentally in routine examination in later years, figure among cases of phthisis in children.

Squire[2] recently examined 672 children in a school in a poor part of London, of whom less than one per cent presented signs which he considered indicative of tuberculosis of the lungs, though about nine per cent had signs which were not quite normal. And again, as a result of a special examination of 47 girls, all of whom were stated to be tuberculous, he found three only who showed conclusive evidence of the disease, though three others had signs which excited suspicion.

In the remaining 32 he was unable to detect any abnormal signs whatsoever. He concludes from his wide experience that pulmonary tuberculosis is not a frequent cause of serious ill-health in children of school age. He believes also that when it is sufficiently extensive to produce ill-health its course is prolonged, and that the child may attend school without detriment to itself and without danger to others. He believes strongly, however, in latent tuberculosis, i.e., that the tubercle bacilli may enter the body and remain inactive for an indefinite time, until some accident or illness may cause the soil to become fertile. He would not, however, exclude such cases from school.

REFERENCES.—[1]*Lancet*, Jan. 15, 1910; [2]*Ibid.* Aug. 6, 1910.

PIROPLASMOSIS. *J. W. W. Stephens, M.D.*

D. Bruce, A. E. Hamerton, H. R. Bateman, and F. P. Mackie[1] describe a disease of calves in Uganda known as amakebe. It proves to be due to *Piroplasma parvum*. The blood showed: (1) "Marginal points," i.e., small deeply-staining bodies, generally near the edge of the red cells; (2) A piroplasma indistinguishable from *P. parvum* of East Coast fever; (3) Koch's blue bodies or granules in the spleen, lymphatic glands, and liver, and occasionally in the kidneys, lungs, and peripheral blood. These bodies are blue masses filled with coarse chromatin granules.

REFERENCE.—[1]*Jour. R.A.M.C.* May, 1910.

PITYRIASIS RUBRA PILARIS (Lichen Ruber Acuminatus).
E. Graham Little, M.D., F.R.C.P.

This rare disease entails so much discomfort on the patient (it is one of the few diseases which may have a universal distribution), and its diagnosis is so important and so difficult, that reference to it may be acceptable, even though all treatment of the condition is so unsatisfactory in its results. Bizzozero[1] reports a very interesting case occurring in a woman aged nineteen, in whom it became rapidly almost universal, and in whom an unusual feature was the presence of lesions with long spines, resembling lichen spinulosus. The eruption consists as a rule of an acuminate papule, very horny, small, and conical, which remains discrete even when the eruption is very thickly aggregated, and with special sites of election, of which the backs of the proximal phalanges are the most significant. The eruption may present the appearance of a continuous scaly sheet of inflammation, with discrete papules at the borders of the large plaques; the skin covering the joints is greatly thickened, giving the appearance of "ichthyosis nitida," and the face and hairy scalp (parts where lichen planus does not occur) are commonly affected. Its relation to other diseases remains indeterminate; its nearest analogy is with psoriasis rather than with lichen planus, and the French name pityriasis rubra pilaris is to be preferred to the German title, lichen ruber acuminatus: the identity of the diseases described under these two names is accepted by the majority of writers. The treatment is exceedingly unsatis-

PLATE XXXII.

PITYRIASIS RUBRA PILARIS.

The picture (from a water-colour drawing) is a good representation of the clinical aspect of Pityriasis Rubra Pilaris untreated for some time. The scaliness of the face, ears, and upper part of the chest is particularly well shown. The inset figure is taken from the forearm, and illustrates, perhaps on a scale too small for distinct appreciation, the conical and discrete papules of which the eruption is made up.

factory: cases appear to clear up for a time under various methods of medication, such as thyroid administration and the local application of demulcent oils and lotions, but they usually relapse.

I have had four cases of this disease under my personal observation, and the picture illustrating this article (*Plate XXXII*) was painted from my first case, which I have been able to watch for seven years. This patient still has the disease, and has more recently developed phthisis. She had a sister with typical psoriasis. In another case recorded by me recently, the eruption was extraordinarily acute, almost the entire surface of the skin becoming involved within fourteen days. The discrete, horny, acuminate, follicular papule, the rapid extension of the disease, and its intractability, are the most important criteria of diagnosis.

REFERENCE.—[1]*Ann. de Derm. et de Syph.* Feb. 1910, p. 84.

PLAGUE. *J. W. W. Stephens, M.D.*

A. Buchanan[1] meets the objections that have been raised to his advocacy of cats as plague preventers. He quotes the opinions of Koch and Kitasato in favour of cats as the best destroyers of rats.

E. A. Walker[2] adduces a certain amount of evidence that plague can be transmitted in India by bed-bugs.

B. K. Rao[3] reports two cases of plague with unusual symptoms, resembling those of cholera, and in one of which plague bacilli were isolated from the fæces.

TREATMENT.—E. N. Thornton[4] advises **Adrenalin Chloride,** from the fact that the suprarenals are always found enlarged and extremely congested, if not actually hæmorrhagic, and as the circulatory system is the one that is at once affected, it was thought that this might be due to changes in the suprarenals. Adrenalin chloride 1–1000, 30 min., with tinct. strophanthi 10 min., was given four-hourly by the mouth for the first three days, and three times a day for the next fourteen days. In a very bad case the drug was given hypodermically or intravenously in somewhat smaller doses. In cases with severe buboes, the treatment was usually begun by injecting 20 min. of the solution near the buboes. Where delirium or sleeplessness prevailed, sulphonal was used. The death-rate by this treatment was only thirteen or fifteen out of fifty cases, of which eight were practically moribund before admission. In the fatal cases there was a marked diminution in the congestion of the organs post mortem.

REFERENCES.—[1]*Brit. Med. Jour.* Aug. 6, 1910; [2]*Ind. Med. Gaz.* May, 1910; [3]*Ibid.*; [4]*Lancet,* Ap. 9, 1910.

PLEURISY. *Joseph J. Perkins, M.B., F.R.C.P.*

Under the term "ozænic pleurisies," Prof. Dieulafoy[1] discusses those cases of pleural effusion in which the fluid is offensive, and subdivides them into the three groups of (1) *Fœtid,* (2) *Putrid,* (3) *Gangrenous.*

1. The *fœtid* are those in which the fluid, while offensive, does not give off gas, and therefore causes none of the signs of pneumothorax, and on cultivation do not produce fermentation or gas; and, in

contradistinction to the gangrenous, contain no trace of necrotic tissue. The explanation is that there are micro-organisms which produce odours just as there are others which produce colours.

2. In the *putrid pleurisies*, a more serious class, gas is formed both within the pleura, giving rise to the signs of pneumothorax, and on cultivation; emphysematous cellulitis is apt to develop after puncture of the chest wall. There is no evidence of mortification or necrosis, and the conditions are the result usually of the action of anaerobic organisms. Effusions of this nature frequently occur as a complication of pelvic disease in women, in whom the vagina has been shown to contain anaerobic germs capable of giving rise to abscesses, and of appendicitis.

3. In the *true gangrenous pleurisies*, necrotic tissue is to be found in the fœtid effusion. They may arise primarily in the pleura, but are more often secondary to gangrene of the lung.

In all three types an exploratory puncture is permissible for the sake of diagnosis, but an offensive effusion once demonstrated, whatever its etiology, puncture must be followed at once by thoracotomy and free drainage to prevent invasion of the chest wall.

(For the use of **Iothion** see *page* 33.)

REFERENCE.—[1]*Hosp.* Nov. 6, 1909.

PLUMBISM. *Robt. Hutchison, M.D.*

SYMPTOMATOLOGY. — Prendergast[1] states that two main systems of classification of the symptoms of lead-poisoning may be made. In the one, regard is had to the action of lead on (1) The brain and nervous system; (2) The sensory-motor apparatus, including the voluntary muscles; and (3) The involuntary muscles, including the vasomotor system. The other system is classified under two main heads: (1) Saturnina mitior, and (2) Saturnina gravior.

1. *Saturnina mitior* would include the prodromata and the lesser symptoms, namely: (*a*) Disorders of digestion, such as dyspepsia and constipation, (*b*) Cachexia, (*c*) Slight blue line on gums, (*d*) Slight colic, (*e*) Anæmia, especially in women, with accompanying symptoms of a minor character, (*f*) Pains of an undefined character in trunk and limbs, (*g*) Loss of appetite, and vomiting, (*h*) Polyuria, (*i*) Slight albuminuria.

2. *Saturnina gravior* would comprise: (*a*) Cachexia and emaciation of a marked character; (*b*) Acute colic, prolonged; (*c*) Fœtid breath; (*d*) Paralysis of arms and limbs; (*e*) Blue line well marked; (*f*) Acute pains in the head; (*g*) Disturbance of vision; (*h*) Tremors; (*i*) Suppression of urine; (*j*) Epileptiform convulsions.

From a clinical point of view, lead-poisoning presents two aspects: in one, the poison enters daily into the system in small doses, and is eliminated by the main emunctories—the liver, the kidneys, and the skin; in the other, the kidneys and the liver are enfeebled from the action of the poison, and lose their eliminating functions, and the poison exerts its baneful powers, and produces the major symptoms.

In the former event saturnina mitior results; in the latter saturnina gravior.

PATHOLOGY.—Goadby and Goodbody,[2] from experiments on animals by the inhalation of lead dust, conclude that the essential and primary effect of lead-poisoning is the production of minute and microscopical hæmorrhages in various portions of the body, including the nervous system; that the clinical symptoms of lead palsy, and its good prognosis when treated early, are explainable by the presence of minute hæmorrhages in the peripheral nerves. The presence of these minute hæmorrhages in the nervous system also gives an explanation of the varied pathological findings of many previous workers.

TREATMENT.—Stephens[3] recommends the use of **Calcium Permanganate** in all forms of lead-poisoning. It may be given in doses of $\frac{1}{4}$ gr. mixed with paraffin, and put up in capsules (Allen & Hanburys). Under its use, the blue line disappears.

REFERENCES.—[1]*Brit. Med. Jour.* May 16, 1910; [2]*Lancet,* Oct. 2, 1909; [3]*Brit. Med. Jour.* May 14, 1910.

PNEUMONIA. *Joseph J. Perkins, M.B., F.R.C.P.*

The features of traumatic or contusional pneumonia are discussed by Parkes Weber.[1] The condition is probably due to the growth of organisms previously present but latent in the tissues, the resistance having been lowered by the injury. In many instances, however, probably no typical consolidation results, but a hæmorrhagic infiltration only, such as has been produced experimentally in animals, with corresponding atypical signs and course. Litten (loc. cit.) attaches special importance in this connection to the lifting of heavy weights, and quotes several cases "in which fatal pneumonia supervened soon after such exertions." The average interval between the accident and the development of pneumonia is two days, the shortest being ten hours, but six days, or an even longer interval up to fourteen days, has been accepted.

Interesting *variations in the course and symptoms* of the disease have been collected by P. Kidd.[2] The onset, not only in old renal patients or the insane, in whom such an onset is the rule, but even in healthy adults, not infrequently may be insidious; recurrent rigors are less uncommon than has been thought, and need not necessarily indicate a very severe infection. Free hæmoptysis, though rare, may be an initial symptom; and the fever does not always conform to the continuous type, as marked remissions may stamp its course, without the presence of any special complication. The earliest physical sign, according to Kidd, is not the fine crepitation of Laennec, but an impaired and weak air entry into some portion of the lung. He has observed three cases of acute mania in non-alcoholic subjects, and, contrary to the usual view that the apex is the seat of the pneumonia when this condition is present, the lower lobe was the seat of the lesion in all these cases. He believes that the delay of resolution beyond a fortnight is rare if the presence of a pleural effusion be excluded, but that it may

occur and last for several weeks, or even months, with complete recovery in the end. He believes in the early movement of convalescent cases, as he has more than once seen apyrexial cases of delayed resolution clear up as soon as the patients were allowed to move about. Induration after acute pneumonia is exceptional, the completeness of the resolution being the striking feature of the disease, but it is not unknown; and Kidd quotes a case in which organization of the alveolar exudate into connective tissue had begun at the end of three weeks.

It is interesting to note in this connection that Broadbent[3] has reported a case in which fever and consolidation persisted for six weeks, and another in which similar conditions obtained for five weeks, the temperature in both cases ultimately falling to normal, and a rapid recovery following.

At the other extreme, the fever may run its course, and abort before the usual period. Such a condition is not uncommon in children, and Le Grand Kerr[4] reports several cases in which the disease came to an end after forty-eight or even after twenty-four hours. Cases in children ending at seventy-two hours he considers quite common. Kerr has seen one case only in an adult in which the crisis occurred on the second day. In the cases reported by Kerr resolution of the affected lung was rapid and complete.

W. P. Herringham[5] reports two cases in which, without the intervention of any effusion to account for it, the heart was considerably displaced away from the affected side; in one, a case of extensive consolidation of the left lower lobe, the cardiac apex was found in the middle line.

Widespread lesions due to the pneumococcus may occur, as in a case reported by A. Fells,[6] in which an empyema, suppurative arthritis of the left hip, and nephritis, were all present. After operation recovery was complete, all trace of the nephritis even being lost. Fells has twice seen sudden thrombosis set in, both times in the left leg; in one of the two the pneumonia was traumatic in origin. As to the rarity of these complications, Hector Mackenzie (loc. cit.), in the discussion before the Royal Society of Medicine in 1907, quoted twelve instances of nephritis in 750 cases, and spoke of thrombosis as occurring once in every 150 cases.

There has been great discrepancy in the results of the efforts to determine the frequency with which the pneumococcus can be shown to be present in the blood-stream, some observers getting results as high as 90 per cent, or even 100 per cent, others as low as 25 per cent.

Strouse and Clough,[7] investigating 25 cases, were successful in 56 per cent only, but they note that the cultures very easily die out after forty-eight hours. In all probability a pneumococcæmia is the rule. The organisms may be found after the crisis, and their presence, or rather the success in demonstrating their presence, seems to have no relation to the severity of the case or to be of prognostic value.

H. A. Hare,[8] following Gibson and Gordon, attempts to find in the ratio of the blood-pressure to the pulse-rate a guide to prognosis and treatment. He points out that the vascular mechanism is as important to life as the cardiac, and holds that one of the great causes of death in pneumonia is vascular relaxation from toxæmia, with the result that the heart becomes exhausted in the vain endeavour to maintain the arterial pressure.

Gibson (loc. cit.) holds that a " pressure appreciably below normal in pneumonia is invariably of evil omen, and any considerable fall bodes disaster. When the arterial pressure expressed in millimetres of mercury does not fall below the pulse-rate expressed in beats per minute, the fact may be taken as an excellent augury, while the converse is equally true." Hare has been able to corroborate this view. In any case in which the blood-pressure expressed as above falls to the pulse-rate, active stimulation must be instituted, and the call for such measure is far better decided by the sphygmomanometer than by our older criteria of the failing heart, and treatment more promptly instituted.

Alex. Napier[9] calls attention to the value of the combination of **Chloral Hydrate** with **Digitalis**, first advocated by G. W. Balfour—7½ gr. to 10 gr. of chloral with 10 min. of the tincture, or 1 dr. to 2 dr. of the infusion of digitalis, every three, four, or six hours. He claims for the mixture that it gives sleep, eases pain and cough, tends to lower the temperature, and slows the heart; and has never found it influence the heart's action unfavourably.

Quisling[10] uses the combination of digitalis with **Camphor**, the latter on account of its power as a cardiac, vasomotor, and respiratory stimulant.

Seibert[11] strongly advocates the use of subcutaneous injections of camphor in oil, giving 12 cc. of a 20 per cent solution every twelve hours. He describes a number of cases in which this mode of treatment gave excellent results. These are due, he thinks, not only to the stimulant properties of the camphor, but to its having a specific action on the pneumococcus; this organism will not grow on culture media if one part of camphor in 10,000 is added. Again, if an emulsion of pneumococci be injected into the vein of the ear of a rabbit, the animal dies as a rule in thirty-six hours; but if one hour after the injection 1 cc. of a 20 per cent solution of camphor in oil be injected subcutaneously, it will recover.

(For **Vaccine** treatment, see *page* 60.)

REFERENCES.—[1]*Brit. Med. Jour.* May 14, 1910; [2]*Lancet*, Jan. 1, 1910; [3]*Hosp.* Ap. 9, 1910; [4]*Med. Rec.* Ap. 23, 1910; [5]*Proc. Roy. Soc. Med.* (Clin. Sect.) Nov. 1909; [6]*Brist. Med.-Chir. Jour.* Dec. 1909; [7]*Johns Hop. Hosp. Bull.* Aug. 1910; [8]*Ther. Gaz.* June 15, 1910; [9]Quoted in *Amer. Med.* Ap. 1910, [10]*Brit. Med. Jour.* May 28, 1910; [11]*Sem. Méd.* Sept. 22, 1909.

POLIOMYELITIS, ANTERIOR. (*See* NERVOUS SYSTEM, SURGERY OF.)

PONOS. (*See* LEISHMANIASIS.)

POROCEPHALIASIS. *J. W. W. Stephens, M.D.*

L. Sambon[1] has collected about a dozen cases of human infection by the nymphal stage of *Porocephalus armillatus*. The mature adult linguatulids occur in the lungs, trachea, and nasal cavities of African pythons and puff-adders. The female measures 9 to 13 cm., and has 18 to 22 rings. The male measures 3 to 4·5 cm., and has 16 to 17 rings. The rings give these parasites the appearance of screws. The eggs measure 108 × 80 μ, enclosed in a membrane measuring 180 μ in diameter. Life history :—The eggs are discharged through the mouth or by the fæces. They are then taken up by mammals, insectivora, carnivora, rodentia, or ungulata. They hatch in the alimentary canal, and the larva, penetrating the gut by its boring apparatus, reaches some organ. It is surrounded by a cyst derived from the host tissues. In this cyst it moults, and becomes the coiled-up nymph, as found in the liver, mesentery, etc., of man occasionally, and not uncommonly in monkeys.

Reference.—[1] *Jour. Trop. Med.* July 15, 1910.

PREGNANCY. *Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.*

The Infection of the Urinary Tract by B. Coli has been investigated by Napier Burnett.[1] This complication of pregnancy has until lately attracted but little notice in this country.

The Symptomatology is very varied in different cases ; and he divides them into (1) *Acute*, (2) *Chronic*, and (3) *Slight types*.

1. In the *acute type* the disease may appear as early as the fourth month of pregnancy, the fifth and sixth being the most common. They may be further divided into : (*a*) Those with bladder symptoms ; and (*b*) Those with renal symptoms. The latter group is much the commonest. The patient is suddenly seized with rigor and high temperature, accompanied by diffuse abdominal pain, which soon becomes restricted to the right renal region. Nausea and vomiting are common, the tongue is furred, and constipation is usually present. The urine is scanty and high-coloured, and some dysuria may be complained of. On examination, rigidity of the abdominal muscles, chiefly over the right side, is noticed. The appendix area may be specially indicated as the seat of the pain, and there may be a degree of flatulent distention. McBurney's point is often the chief site of the tenderness, but the most characteristic feature is extreme hyperæsthesia over the right kidney region, and especially the costo-vertebral angle. In cases with bladder symptoms there is tenderness per vaginam over the bladder base, specially marked at the site of the right uretero-vesical junction in a large percentage. The fever is usually preceded by a rigor, which may be repeated. The temperature rises abruptly to 104° F., falling again in the morning to 99° or even 97° F. After a few days it becomes more constant, and the patient may be delirious.

The urine is acid, and passed in moderate quantity. It is often turbid, due to flakes of lymph, shreds of epithelium, and pus cells.

Bacilluria is, of course, present, and when very marked the urine may be turbid from this cause alone; but in slighter cases it may be quite clear. Albumin in small quantity is always present, and occasionally a trace of blood. Microscopically, pus cells and active leucocytes are seen, and the *Bacillus coli* can be recognized in pure culture. There is usually considerable epithelial débris, the cells being caudate in appearance. They may be derived either from the kidney or the bladder. The origin of the pus and epithelial cells can only be absolutely ascertained by ureteral catheterization.

The course of the disease untreated is several weeks, with deepening toxæmia and repeated rigors, passing into a definite condition of septicæmia. Abortion often occurs.

2. In the *chronic type* the onset is more insidious, with malaise, muscular pains, and irregular fever. Headaches and general fatigue are complained of, and pain and tenderness of the structures overlying the kidney and ureter are present more or less. Bladder signs may be slight or absent.

3. In the *slight cases* the only complaint may be "lumbago," with occasional griping pains in the right side. Stoeckel asserts these cases to be very common, and by catheterizing the ureters he has proved considerable retention of urine in the renal pelvis, especially on the right side.

The virulence of the colon bacillus varies much. It is least in the healthy bowel, but becomes exalted under conditions of disease or transportation to other situations. It is probable that several varieties exist. P. Ganndler has shown that there is no agglutinative action of the serum of a healthy individual from the presence of the *B. coli* in the gut, but its appearance in the urinary passages at once produces it.

Diagnosis.—This is easier when bladder symptoms are present, for attention is then at once directed to the urinary tract. But in the acute cases, bladder symptoms are usually absent, and *various intraperitoneal infections are closely mimicked.* Thus, the diagnosis of appendicitis is frequent. Burnett quotes a number of cases in which this mistake was made, and adds that in a pregnant woman no operation on that organ should be entertained until ureteral catheterization has been performed and the urine examined. Acute intestinal obstruction may be diagnosed because of the acute onset of the pain, the vomiting, and the flatulent distention so often present. The symptoms of acute cholecystitis may be simulated, especially in late cases in which the toxæmia has resulted in a degree of jaundice. Cases of acute *B. coli* pyelitis have also been diagnosed as malaria. Pneumonia and pleurisy are mimicked sometimes, owing to the acute pain over the right side; one of Burnett's cases illustrates this mistake. Finally, the symptoms may suggest a calculus in the kidney or ureter.

Discussing the points which guide one to a correct diagnosis, Burnett lays stress on: (1) The sudden onset of pain, with a rigor in a pregnant woman previously in good health; (2) The location of the pain on the right side; (3) Tenderness in the appendix area, associated with

hyperæsthesia over the right renal region; (4) Acute abdominal distention; (5) The results of investigation of the urine.

CAUSATION.—Two theories are extant: (1) The hæmatogenous, in which the kidney is infected *via* the blood-stream; and (2) The urogenous, which assumes an ascending infection, either up the lumen or along the wall of the ureter. It is generally believed that the condition is associated with a degree of retention in the pelvis of the kidney, but there is reason to believe that this is not primary and due to pressure on the ureter by the pregnant uterus, for the disease also occurs in men and children, nor is it associated with uterine myomata. Another remarkable feature is the preference of incidence on the right kidney. No explanation of this fact is yet forthcoming. Out of 77 cases recorded by Lenhartz, 36 were on the right side, 17 on the left, and 24 on both sides.

TREATMENT is divided into (1) General and (2) Specific. The most efficient drugs are the **Alkalies.** The citrates and acetates of potassium or sodium, when given in large doses (30 to 40 grs. every three hours), exert a marked control over the disease. **Urotropin** has been praised; but Burnett has not found it very serviceable in cases of pure *B. coli* infection. If, however, streptococci or staphylococci co-exist in the urine, it or its ally, **Helmitol,** should be given. Sodium benzoate, salol, and boric acid are other drugs that have been used.

Serum treatment has not proved successful, but **Vaccine** treatment has been well spoken of. It should be prepared from the strain isolated from the patient's urine. Recently, very good results have been claimed for the method of **Douching** the kidney pelvis with an antiseptic through the ureteral catheter. Stoeckel, who writes enthusiastically of the treatment, uses 1 per cent silver nitrate solution. Drainage of the kidney by nephrotomy has been suggested.

Finally comes the question of the **Evacuation of the Uterus.** It might be feared that this procedure would be associated with special risk in view of the infected state of the patient; but in Burnett's experience this is not the case, and the immediate improvement manifested is such that he would have no hesitation in carrying it out in a severe case, where ordinary palliative treatment had been unavailing.

The paper thus epitomized is an extremely valuable one, being the first exhaustive contribution on a disease hitherto but little known, and only now beginning to be recognized by the profession in Great Britain.

REFERENCE.—[1]*Brit. Jour. Obst. and Gyn.* July and Aug. 1910, pp. 43, 81.

PROSTATE, DISEASES OF. *E. Hurry Fenwick, F.R.C.S.*

Abscess. — Alexander,[1] of New York, contributes an important article upon the operative treatment of prostatic abscess when that is consequent upon gonorrhœa. He admits that the usual procedure of laying open the prostatic abscess into the prostatic canal by thrusting a finger into it through a median perineal incision, is

especially good in cases of a single focus of suppuration, or of a large prostatic abscess where one or both lateral lobes have been practically destroyed by the suppurative process; but contends that this operation is not applicable to cases of multiple abscesses of the prostate. In this class of cases, which are by far the most numerous, he believes that time can be saved, and a more perfect cure can be effected, by the entire removal of the diseased lateral lobe or lobes by median perineal prostatectomy.

In 1905 he found that on parenchymatous suppuration of the prostate, when detected early, the affected lateral lobe was the seat, not of a single abscess, but of multiple abscesses, and that it was usually by the union of several of these isolated foci of suppuration that the typical large prostatic abscess was formed. He also observed that often, when a single small abscess was opened and drained, another abscess which had been overlooked, or had not fully formed at that time, would require operation again later on. These relapses, he found, could be prevented by the removal of the diseased lateral lobe. He has therefore continued to remove, in many cases, the portion of the prostate which was the seat of an abscess, by median perineal prostatectomy by the same method which he has consistently employed in all cases of enlargement of the prostate since 1896.

Alexander makes an important point by showing that the abscesses always occur in the lateral lobes, and especially in that part of them situated at the side of the urethra. One lobe only may be affected; but it is not uncommon to find suppurating foci in both. The extent of the destruction caused by these abscesses is not the same in each lobe. One is usually more affected than the other. An early operation may do much, he thinks, to preserve at least one-half of the prostate. The abscess may be situated near the urethra, or in the centre of the lobe, or near the capsule. An abscess of small size near the urethra may rupture spontaneously into this canal, and if the drainage is good, the cavity of the abscess may heal. This happy termination is, however, more theoretical than real. Multiple suppurating foci scattered throughout the prostate occur as a rule, and therefore, in many cases in which one abscess has ruptured spontaneously into the urethra, an operation will be required.

Enlargement of the Prostate.—Freyer,[2] in an interesting article on the removal of the prostate in octogenarians (the decade between 79 and 89), records fifty-seven operations with six deaths. He considers one of the remarkable features of this operation to be the success that has attended its employment in advanced old age, and that age has comparatively little influence on the results, provided the vital organs, and particularly the kidneys, are unaffected or fairly sound. He rightly qualifies this opinion by adding that patients of this advanced age are a source of much anxiety, and operation should not be undertaken in such cases without the most careful nursing being available, as well as the constant supervision of the surgeon.

The most anxious period is during the first few hours after operation, for though, when placed in bed, the patient's pulse may be strong and regular, and everything may seem progressing satisfactorily, in an hour or two collapse may set in, when restoratives of all kinds must be had recourse to, namely, normal salines, brandy and strong coffee per rectum, warm clothing, hot-water bottles, and strychnine hypodermically. Once this period is passed and reaction sets in, as a rule the patient progresses uninterruptedly towards recovery.

The mortality has been gradually diminishing in Freyer's hands from 10 per cent in the first 100 cases, to 4·24 per cent in the last 200.

The Effects of Prostatectomy on the Sexual Powers.—Records of the effects of suprapubic prostatectomy upon the sexual function of the patient are incomplete, but Young,[3] of Baltimore, has collated the results on this function of removing the prostate by the perineum. Letters with numerous questions in regard to the effect of the operation on erections, coitus, the act of ejaculation, etc., have been sent to all Young's patients. Seventy-six patients, who had stated before operation that erections and intercourse were normal, replied, and if their answers are collated, a very fair idea may be gathered of the results obtainable by a conservative perineal prostatectomy in which the ejaculatory ducts and the floor of the urethra are carefully preserved. As the time after operation lengthens, the percentage of perfect restorations of sexual powers increases considerably, and it is fair to state that ultimately in about 80 per cent of the cases in which sexual powers were normal before operation, they finally become normal after operation. Very interesting indeed is the statement given, that in quite a number of cases in which intercourse was impossible before operation on account of impaired or absent erections, there has been a complete restoration of the sexual powers as a result of the operation. In a few instances in which the patient complained of an impairment as a result of the operation, a urethroscopic examination has shown considerable enlargement and inflammation of the verumontanum. A few applications of the nitrate-of-silver stick has been followed by a return of the erections, and it seems probable that decline in sexual vigor is due largely to disturbances of the verumontanum, as in sexual neurasthenias of younger men.

Cancer.—The differential diagnosis between the benign and the cancerous growth of the prostate is of an importance far exceeding the mere technique of removal of the enlarged gland. It has always been allowed since McGill's time that the benign could be shelled out with fair result, but that the results of removal of the cancerous organ were deplorable. We have not advanced much in success since that time, and the present-day literature is strangely silent as to the failures in prostatectomy which are due to inaccurate diagnosis ; the successes in prostatectomy refer to the benign type ; one does not hear of the deaths due to attempting removal of cancer of the prostate under the belief that the growth was benign. This is not only a failure in surgery, but in diagnosis and judgment, and the sooner such failures

are placed before the profession, so soon will that optimistic view that *all* prostates are removable be properly balanced.

Hugh Young,[4] of Baltimore, who has had an experience of 400 perineal prostatectomies, has compared the two types. In making this comparison, he takes a series of 145 cases of benign prostatic hypertrophy which were exhaustively studied two years ago, and a series of 111 cases of carcinoma of the prostate which he has recently published.[5] In the 145 cases, the prostate was described as distinctly soft in 56, elastic in 26, firm in 45, moderately hard in 14, very hard in no cases. The seminal vesicles were slightly indurated in 19, moderately indurated in 5. Glands were palpable in the pelvis in 5 cases. In his 111 cases of cancer, the prostate was soft in 2, elastic in 1, slightly indurated in none, moderately indurated in 6, very hard in 78, stony in 9, in places very hard and in others soft in 10 cases. The seminal vesicles were indurated in most, generally very greatly in 88 cases, and the membranous urethra was indurated in 35. These figures show at once the very great *importance to be attached to induration in the prostate in men past forty years of age.* In a few cases only a small area was involved, but it was invariably very hard. The two cases in which the prostate was soft were those in which hæmatoma was present beneath the capsule. The posterior surface of the prostate was irregular in 14 cases of prostatic hypertrophy, and nodular in only one, whereas in carcinoma it was rough and nodular in 69 cases. It is a remarkable fact, however, that in most cases of carcinoma of the prostate, the posterior surface is smooth until late in the disease.

The cystoscope showed in hypertrophy of the prostate an absence of intravesical enlargement of the lateral lobes in only 13 cases, whereas in 45 cases of cancer the lateral lobes were considerably enlarged in only 7, and in the rest of the cases either not enlarged or only very slightly so. The median lobe of the prostate, which was so commonly enlarged in hypertrophy, was generally no more than a small bar in carcinoma, there being only 5 cases in 46 in which a small rounded lobe was present. In all of these cases, when the median and lateral portions of the prostate were present as rounded lobes, they were found to be adenomatous hypertrophies which were present at the same time with carcinoma. Young therefore insists on cystoscopy before operation. Pathological examination showed that the carcinoma involved the posterior subcapsular stratum of gland tissue, whereas the hypertrophy involved the lateral and median lobes and projected into the bladder, the two being distinct and separate processes, and the lateral lobes apparently preserved intact by their thick capsules, which seem to prevent the ingrowth of cancer. Another very distinctive finding in cases of cancer was marked thickening of the entire suburethral portion of the prostate, whereas in hypertrophy there was only thickening in the region of the median lobe.

A study of these cases showed that carcinoma of the prostate

was about one-fourth as frequent as hypertrophy (100 cases of cancer to 400 of hypertrophy); that there was often carcinoma in cases in which no hypertrophy was present; that when the two occurred at the same time, the cancer generally involved only a transverse layer beneath the posterior capsule, and the two diseases remained distinct for a long time; that carcinomas grow upward into the space beneath the trigone and not toward the rectum nor the bladder, which was seldom involved, even late (and then through the trigone and in the region of the ureteral orifices); that induration should be viewed with great suspicion; that great hardness should always lead to an exploratory operation; and that in cases of pure carcinoma there are no enlarged intravesically projecting lateral or median lobes, but in about 50 per cent of the cases a benign hypertrophy of the lateral lobes is present, and these may project into the bladder.

The value of the cystoscope has been very decisively proved in this series of cases. It was employed in fully 95 per cent, and was very valuable in demonstrating beforehand the condition of the bladder, ureters, and intravesical portions of the prostate.

The procedure adopted for those cases in which cancer was suspected by Young was as follows: The operation was begun as for benign hypertrophy; that is, a Λ-shaped cutaneous perineal incision, blunt dissection of the space on each side of the central tendon posterior to the transversus perinei and anterior to the levator ani, division of the central tendon and recto-urethralis, linear incision of the membranous urethra, insertion of the tractor, and exposure of the posterior surface of the prostate by pushing back the rectum. Careful palpation was then made, and if the prostate was of stony hardness it was always found to be cancer. If the prostate was somewhat elastic, an incision was generally made, parallel with the urethra, through the capsule on one side, and an inspection of the cut surfaces was made. A peculiar gritty sensation to the knife, suggesting a very fibrous tissue, and numerous small yellowish dots and lines in a greyish stroma, would usually be present if the case were carcinoma. If it were impossible to make a naked-eye diagnosis, a piece of tissue was taken for a frozen section, which was stained at once, and examination made while the operation halted. Not more than six to ten minutes were thus consumed as a rule, and if the case were found to be a fibrous prostatitis instead of carcinoma, the usual operation for benign hypertrophy, namely, enucleation of the lateral and median portions of the prostate, was then performed, the urethra and ejaculatory ducts and vesical sphincter being preserved. If the disease was found to be carcinoma, and previous examination had demonstrated that a radical operation was feasible, this was at once begun by severing the membranous urethra, freeing the anterior and lateral surfaces of the prostate, dividing the bladder just above its junction with the prostate, cutting across the trigone about 1 to 2 cm. below the ureters, and finally excising the vasa deferentia and seminal vesicles, with the entire prostate, prostatic urethra, capsule, and cuff of bladder in one piece.

An anastomosis between the large opening in the bladder and membranous urethra was then made, no difficulty being encountered, as a rule, in making a tight closure (and in getting subsequently a good union). If the disease was found to be carcinomatous, but previous examination had showed that the seminal vesicles were completely involved, or that the invasion had extended too high for any hope of complete excision by the operation above outlined, a simple conservative perineal prostatectomy was performed, great care being taken not to excise any mucous membrane, and to dig out carefully the mass of carcinoma in the median portion of the prostate, and sometimes beneath the anterior portion of the trigone. The wound was then closed, as in cases of hypertrophy, with double tube drainage for the bladder, light gauze packs for the lateral cavities, suture of the levatores ani, and partial closure of skin with catgut.

Post-operative treatment in all these cases was about the same: water in abundance; infusion immediately after the operation (and frequently repeated if necessary on account of uræmia); patient out of bed as soon as possible, generally the second or third day; gauze and tubes out on the day after the operation, and no subsequent instrumentation except before the discharge of the patient, when a catheter was passed to see whether the bladder emptied itself completely.

Young gives the result of six cases in which he performed the radical operation of removing cancer of the prostate. In five cases the operation was carried out with apparent success and without shock, but a study of the specimens removed showed carcinoma near the upper limit in two cases. In one (patient dying of shock), autopsy showed extensive carcinoma of the peritoneum and retroperitoneal glands, although the bladder and seminal vesicles were free from invasion. In one case the patient died nine months after the operation as a result of traumatism and infection, in the attempt to remove a stone adherent to a silk suture. Autopsy showed a very small area (1 cm. in diameter) of recurrence in the back of the bladder. In one case the patient lived over three years in comfort, but autopsy showed extensive metastases in various parts of the bladder, the bladder and urethra, however, being free from ulceration. In one case in which the patient died six weeks after the operation, from ascending renal infection as a result of the intentional but injudicious division of the two ureters, an extremely careful post-mortem examination of all the pelvic tissues, with numerous sections taken for microscopic study, failed to reveal any evidence of carcinoma, and it seems probable that the disease had been completely eradicated. Two patients are alive and apparently well, one six months and the second four and a half years after the operation. In both of these cases the specimens showed that the disease had been completely removed with a fairly wide margin, and in one case, at least, the lapse of time seems to imply a radical cure.

As a result of the experience gained in these six cases, the following

may be said: (1) The operation should not be attempted in cases in which the infiltration extends more than a short distance beneath the trigone, as determined by the cystoscope and by examination with the finger in the rectum and the cystoscope in the urethra; or in those in which the upper portions of both seminal vesicles are involved; or in those in which an extensive intervesicular mass, indurated lymphatics or glands, involvement of the membranous urethra or muscles of the rectum show that the disease is manifestly too far advanced. (2) The ureteral papillæ should be left intact, with sufficient tissue below them to insure proper suture and leave their openings free, 1 to 2 cm. above the wound. (3) Hæmorrhage should be carefully checked (by hugging the capsule, injury of the periprostatic plexus may be largely avoided). (4) Silk should never be used in making the urethro-vesical anastomosis, on account of subsequent deposits of lime salts, but chromicized catgut, with occasional sutures of silkworm gut (left long for subsequent removal), are the best. (5) When the operation is attempted early, it can be performed without much danger or great difficulty, and with excellent chance of cure. (6) Only three of the six cases above recorded were suitable for operation. In all of these the disease was apparently completely removed, and one patient is now apparently well, four and a half years after the operation.

Stenosis of the Vesical Outlet following Prostatectomy.—A search through the literature on prostatectomy shows but few reported cases of stenosis of the vesical outlet following operation. Some writers allude merely to the desirability of an occasional passage of a sound to guard against possible stricture of the deep urethra, and others regard this as an unnecessary precaution.

Young,[6] in dealing with an experience of 400 cases of perineal prostatectomy, says that in his experience the passage of sounds is absolutely unnecessary in fully 99 per cent of the cases. In very rare instances a slight contraction occurs in the membranous urethra several months after the operation, but he has not seen a single case of definite fibrous stricture following the operation, and he does not know of more than two patients who have had sounds passed occasionally since the operation. To pass a sound is always to invite epididymitis and traumatism of the verumontanum, and it is nearly always as unnecessary as it is inadvisable.

Freyer[7] also, after an experience of 644 cases of enucleation of the prostate suprapubically, disallows the occurrence of stricture of the orifice at all, and in a discussion on the subject stated that in two or three of his earlier cases he noticed that there was some difficulty in introducing a large catheter, and this he attributed to an hour-glass contraction, which he thought was due to spasm at the neck of the bladder. To obviate this occurrence, and for other reasons, he now, on removal of the large drainage tube on the third or fourth day, put a small tube in its place, which he kept in till the twelfth or thirteenth day, thus preventing any urine from passing

through the urethra. On the removal of this tube, a large catheter was passed daily, and the bladder washed out through it, till the surface wound was completely closed. This daily passage of the catheter had the additional effect of moulding the parts and obviating spasm at the neck of the bladder. Since he had had recourse to this procedure he had not noticed this phenomenon.

Hurry Fenwick has met with three well-marked examples, and has successfully grafted horses' urethras into the gap in order to combat the contraction.[8]

Two cases of stenosis of the vesical outlet after prostatectomy have, however, come under the notice of Bentley Squier,[9] and he has reported them in detail. They demonstrate that cicatricial stenosis of the vesical outlet may occur after either perineal or suprapubic operation. The prostatectomy in each instance recorded by Squier had been performed by an operator with a wide knowledge of the surgery of this region, and therefore the element of error in technique can be practically eliminated.

Possibly the complete removal of the prostatic urethra at the time of operation may be responsible for the condition described, but as so many cases have been reported in which such removal apparently had no dire after-effects, this supposition is theoretical. It may be important to note that the cicatrix following the perineal operation extended along the site of the prostatic urethra for some distance, whereas the cicatrix resulting from the suprapubic operation formed only an essential collar around the vesical outlet, and did not appreciably invade the deep urethra.

The first case of this character was a patient of Dr. L. Bolton Bangs. The patient was aged sixty-six, and gave evidences of marked general sclerosis. Perineal prostatectomy was performed for, practically, total retention of urine, and the patient made a quick, uneventful recovery from the operation. At the end of eighteen days, when he left the sanatorium and returned to his home, he was voiding urine every four hours and completely emptying his bladder. A month later he began to develop increased frequency, with dysuria. The stream had become dribbling and feeble. His physician found it impossible to catheterize him, and Dr. Bangs was called to his home in consultation. As Dr. Squier had assisted Dr. Bangs at the prostatectomy, he was invited to be present at this consultation. It was found impossible to enter the bladder with any instrument, the obstruction being deep in the urethra. Suprapubic cystotomy was decided upon, with the idea in view of retrograde catheterization. After the bladder was opened, the following conditions were found, the description of which is given in Dr. Bang's graphic words: "Careful examination of the interior of the bladder, repeated both by myself and my associate, Dr. Squier, failed to find any normal internal meatus; but at the anatomical situation of the latter, a shallow, funnel-shaped dimple could be felt. All efforts to introduce instruments of minute size into this dimple failed. Consequently,

a staff was placed in the urethra and the perineum freely opened. Short, thick, interlacing fibrous bands had displaced the normal structures, and although there was a series of shallow pockets between these bands, forming a semblance to an irregular channel, no opening leading from this channel into the bladder could be found. A blunt-pointed instrument was then placed in the conical dimple within the bladder, and being held firmly in place by my associate, I severed the bands in the perineum until the point of the instrument was reached, and an opening was thus made into the bladder through which the index finger could be introduced. A sound of the size of 26 F. was then easily passed from the meatus into the bladder. Suprapubic and perineal drainage were established, which the patient bore very comfortably, and convalescence from this second operation was uneventful."

The second case occurred in Squier's own service at the New York City Home. The patient was sixty-nine years of age. His urinary history dated back to November, 1906, when a benign tumour was removed from his bladder by suprapubic incision at the Metropolitan Hospital in New York City. On June 9th, 1908, at a second New York City hospital, he was given suprapubic drainage of the bladder for the relief of retention of urine. He left this hospital before the wound had healed, and was lost sight of until October, 1908, when he appeared at another New York City hospital, and a suprapubic prostatectomy was performed by a surgeon well skilled in such work. Following this operation, a ventral hernia developed, and three months later he went under a secondary operation for repair of the rupture. He came under Squier's care on February 9th, 1909, when he was suffering from dribbling of urine, tenesmus, dysuria, and abdominal pain. It was found, on examination, that the bladder was distended almost to the ensiform cartilage, and the patient's general condition was very grave. Repeated attempts to enter the bladder by way of the urethra demonstrated an impassable obstruction to the entrance of any instrument, even a filiform bougie. Suprapubic cystotomy was at once performed under local anæsthesia, and a condition was found similar to that in the case previously related. The situation of the internal meatus was located by a dimple, in the centre of which was an opening through which it was barely possible to pass the finest filiform. This opening was enlarged by making stellate incisions through a dense cicatrix which had formed around the vesical neck at this point. A sound, No. 30 F., was passed through the penile urethra into the bladder, after it had been demonstrated by the bougie à boule that there was no stricture formation at any other point in the urethra. The bladder was drained suprapubically. The consequent course of the convalescence was uneventful. A sound was passed every three days for three weeks. The suprapubic wound healed kindly, and now, three months after operation, the patient empties his bladder completely, and the occasional passage of a sound has kept the urethra patent.

References.—[1]*Ann. Surg.* Ap. 1909; [2]*Brit. Med. Jour.* Oct. 2, 1909; [3]*Jour. Amer. Med. Assoc.* Mar. 5, 1910; [4]*Ibid*; [5]*Ann. Surg.* Dec. 1909; [6]*Jour. Amer. Med. Assoc.* Mar. 5, 1910; [7]*Brit. Med. Jour.* Oct. 2, 1909; [8]*Proc. Amer. Surg. Assoc.* 1906; [9]*Med. Rec.* Oct. 2, 1909.

PRURITUS. *E. Graham Little, M.D., F.R.C.P.*

Bunch[1] has some suggestive remarks on this subject. In adult patients, when no signs of pediculi, scabies, lichen planus, or other skin lesions can be detected, the investigation of the urine for sugar is important. The **Diet** should be carefully ordered: tea, coffee, alcohol, and all rich and highly seasoned food prohibited. Vegetarianism may agree with the patient better than a mixed diet. **Rest** and change of scene, such as are secured by proper nursing or spa treatment, are most valuable. Internally, **Salicylic Acid** in some form, alone or in combination with antipyrin, antifebrin, or phenacetin, may be used. **Carbolic Acid** in pill form, **Atropine, Pilocarpine,** or **Arsenic** may be tried. Sedative measures, such as the administration of **Sodium Bromide, Cannabis Indica, Tincture of Aconite,** or **Tincture of Gelsemium,** should be tried in the worse cases before the use of hypnotics like chloral, sulphonal, or trional is compelled. Externally, evaporating lotions are the best means of relief. Equal parts of **Eau de Cologne** and water, or **Lavender Water,** dabbed on the skin, give a pleasing sensation of coolness. Sponging with very hot water, vapour baths or Turkish baths will often check itching. Oatmeal, gelatin, starch, or linseed, mixed with the hot water of the bath, may be useful.

Of lotions for direct application, the following formulæ are recommended:—

℞	Liq. Plumb. Subacet.	℥ij	Aq. dest.	ad ℨvij
	Aq. Lavand.	ℨj		
℞	Acid. Hydrocyanic. dil.	℥iss	Glycerini	ℨss
	Spt. Rosmarini	ℨj	Aq.	ad ℨx
℞	Acid. Carb.	℥j	Eau de Cologne	ℨss
	Glycerini	ℨss	Aq.	ad ℨx
℞	Ichthyol.	℥ss	Spt. Lavand.	ℨss
	Sod. Bicarb.	℥iss	Aq.	ad ℨviij

In pruritus vulvæ, where a discharge is present, this must be treated with douches of 1–5000 permanganate, or 1–5000 perchloride, or 1–1000 zinc sulphate. After this a vaginal tampon is inserted and the external parts are covered with Lassar's paste, with 1 per cent silver nitrate, or the following ointments:—

℞	Chloral. Hyd.		Lanolini	
	Menthol.		Vasilini	āā ℨss
	Camphor.	āā gr. xlv		

When great discomfort from itching is present, 5 per cent cocaine may be added to any of these ointments.

In cases of diabetes, the patient should of course be dieted, the urine, when possible, drawn off with a catheter, and the vulva covered with a sedative dressing such as ung. cascin 100, ichthyol 2.

Pruritus ani, when accompanied by eczema, should be treated first with 3 to 5 per cent salicylic ointment and plaster. The following ointment may relieve :—

℞	Liq. Carbon. Deterg.	℥ss	Ung. Conii	℥j
℞	Creosote	℥ss	Adipis	℥j
	Tinct. Aconiti	ℿx		
℞	Tinct. Aconiti	ℿiij	Ol Rosmarini	ℿx
	Zinci Oxidi		Vasil. Alb.	℥j
	Calomel	āā ℥ss		

These ointments are best used at night, bathed off in the morning with olive oil, and the following powder applied :—

℞	Chloral. Hyd.		Amyli	℥j
	Camphor.	āā gr. xl		

Or the following lotions may be used :—

℞	Ol. Cadini	℥j	Aq. dest.	℥j
	Eau de Cologne	℥ss	Tinct. Quillaiæ q.s. ut fiat emuls.	

Morphia and cocaine suppositories should be used only as a temporary sedative. Surgical operation may be finally required, the cutaneous nerves being divided.

(For **X-ray** treatment, see *page* 78 ; **Radium,** *page* 84.)

REFERENCE.—[1]*Lancet*, May 7, 1910.

PSILOSIS PIGMENTOSA. (*See* PELLAGRA.)

PSORIASIS. *E. Graham Little, M.D., F.R.C.P.*

Pollitzer[1] reviews the most plausible current theories of the causation of psoriasis under the following heads: (1) Constitutional causes (gout, rheumatism) ; (2) Disturbances of nervous system ; (3) Hereditary predisposition ; (4) Local and external causes. Pollitzer regards the first class of causes as discredited by various experimental and statistical evidence. The second group of causes he also regards as "not proven." An examination of various statistical statements shows that psoriasis is "inherited" in only about 25 per cent of the cases, so that this cause would not appear sufficient. The fourth and last explanation Pollitzer accepts as satisfactory, and would include psoriasis and seborrhœic eczema, so-called, in one category, and ascribe both diseases to the presence of an infective micro-organism not yet identified with certainty. Schamberg[2] made some attempts to isolate a microbic organism from scales of psoriasis, but obtained no constant result in ten experiments. He subscribes to the parasitic theory, but regards the parasite as undetermined as yet. The net result of a very full and interesting debate was that we are no more advanced in our knowledge of the cause of psoriasis than we were fifty years ago.

THE TREATMENT of psoriasis has undergone more change ; external treatment is far more practised and relied upon than formerly, when

diathetic theories were more confidently sustained than at present. Graham Little[3] has a paper on this subject in which a perhaps useful distinction is made between the handling of patients who can lie in bed and give themselves up to treatment, and of those who are obliged to continue their daily avocations. The value of **Chrysarobin** as a local application is especially insisted upon. The following methods are mentioned. As an ointment which, being very adhesive, remains in contact with the diseased areas, and does not "run" and so cause dermatitis of the healthy parts:—

R	Kaolini Levigati	ʒij	Lanolini	ʒiv
	Amyli	ʒiv	Paraff. Fluid. Alb.	ʒij

To this is added chrysarobin (gr. xv–xxx ad ℥j). For small patches resistant to the above, the following ointment stick is useful:—Chrysarobin 3, white wax 2, lanolin 5.

For the scalp, where chrysarobin is apt to stain the hair, oil of cade is substituted, as in the following formula, which constitutes an ointment that does not stain and is easily removed by washing:—

R	Ol. Cad. pur.	grams 50	Glycerini Amyli	grams 45
	Ext. Quillaiæ	cc. 5	Essent. Caryoph.	cc. 2

References.—[1]*Jour. Cutan. Dis.* Nov. 1909; [2]*Ibid.* Nov. 1909; [3]*Lancet*, Mar. 26, 1910.

PSYCHO-NEUROSES.

Bedford Pierce, M.D.
Norah Kemp, M.B., C.M.

During the past year an increasing amount of attention has been given to Freud's methods of studying and treating hysteria and the psycho-neuroses. An outline of these new conceptions appeared in the last volume of the *Medical Annual*. An able and sympathetic review of the whole subject is given by Bernard Hart.[1] "There can be no question," he says, "that Freud's works contain some of the most valuable and stimulating contributions ever made to the progress of psychiatry. He has carried psychological determinism and the psychology of the *individual* to an extent never previously attempted. His demonstration of the fact that the flow of phenomenal consciousness is conditioned by psychological causes, of whose existence the individual is altogether unaware—a fact known implicitly to every competent novelist and historian—opens up a fascinating vista for future research. We owe to Freud, again, the first clear formulation of the principle that mind can be treated as a phenomenon, capable of *psychological* explanation, and the first systematic attempt to construct conceptual psychology—certainly a notable departure in the history of science. He has, moreover, established a firm basis for the oft-repeated phrase that the mental processes of the insane are only exaggerations of those found in the sane. Most important of all, he has shown the vast rôle which mental conflicts play in the psychology of both sane and insane."

Hart's review is not entirely appreciative, and he criticizes the extent of the generalizations which Freud has made upon little data,

and in particular his theory as to the significance of sex in the production of disease.

Although it is impossible to give even an outline of the theories which underlie treatment by psycho-analysis, it may be well to explain that they constitute an attempt to ascertain the evolution of many nervous and mental disorders along psychological lines, and the whole enquiry contrasts strongly with the biochemical investigations which lead to the conclusion that psychoses largely depend upon toxic disturbances.

Beginning with hysteria and the psycho-neuroses, this line of investigation has been followed with considerable success in the study of certain forms of insanity, paranoia, dementia præcox, and even some cases of acute confusional insanity. Indeed, there is reason to hope that Freud's methods of study may illuminate the whole field of psychological medicine, in that an explanation may be afforded of symptoms which previously appeared altogether bizarre and incoherent.

The object of psycho-analysis is to unravel and elucidate the trains of thought which have directly or indirectly produced the morbid psychical disturbance. It is assumed that the content of mind at any given time depends upon previous mental experiences which may or may not be consciously remembered. It happens in the life of every one that many past experiences are painful, and that ideas and memories arise which are distasteful and even repulsive, and which the individual endeavours to forget. This repression of past experiences is therefore a normal process, and the mental conflict which this repression involves varies in intensity according to the nature of the experience in question and the temperament of the individual. These memories and the emotions aroused by them are termed "complexes," and are assumed to have a permanent existence in the mind. When they cannot be called into consciousness they are termed "buried complexes." Under normal conditions these complexes cause little or no difficulty; but sometimes the repressed thought and memory may fail to be assimilated, and may give rise to symptoms which appear to have no connection with them, and in this way neuroses develop. "The distortion in the manifestation of the activity of the mental complex is often exceedingly involved, and one of the main difficulties in the psycho-analytic method is the unravelling of the confused end-product, which clinically we call a symptom." . . . "Every psycho-neurotic symptom is to be regarded as the symbolic expression of a submerged mental complex of the nature of a wish. The wish, on account of its inacceptable nature, is concealed, and the symptom arises as a compromise between it and the repressing force exerted by the main personality. The stream of feeling that characterizes the wish is dammed up, it can find no direct outlet, and so flows in some abnormal direction" (Ernest Jones[2]). In this way arise phobias, conversion hysteria, tics, and obsessions. "Enabling the patient to discover and appreciate the significance of the mental process that manifests itself as a symptom is the central aim of the

psycho-analytic method" (*ibid.*). It is claimed that if the original complex is discovered, and the physician is able to discuss the question frankly with the patient, the distorted manifestations disappear of themselves. It is as if the removal of a foreign body led to the disappearance of a whole train of symptoms produced by reflex irritation. The published cases[3] leave no room for doubt that favourable results follow this treatment, although the theoretical explanation of it may not be altogether convincing.

It will not be possible to do more than merely mention the methods employed in psycho-analysis. Three are chiefly used: (1) *Free association*; (2) *Word association*; (3) *Dream association*.

1. In *free association* the patient is encouraged frankly to express every thought that comes into his mind when a given subject is introduced by the physician. He must honestly state what comes, even if it appears irrelevant or unsuitable. This method is found of greater value than enquiry under hypnosis, which Freud formerly used.

2. Jung's *word association* is also of great value.[4] In this a series of words are separately enunciated, and the patient is asked to state as quickly as possible the first idea that each word suggests. The time taken is noted in each case. It is found that when subjects touching the buried complex are alluded to there is hesitation and marked delay. The selection of words is of course of importance, and by suitably interpolating critical ones, the response will frequently indicate some repressed train of thought.

3. The study of *dreams* frequently shows that they give symbolic expression to the repressed complex. The censorship of conscious thought is removed during sleep and in the half-waking state, so that long-forgotten memories come to light. It is, however, often extremely difficult to trace the connection between dream experiences and the buried complexes. An interesting account of this method of investigation is given by Ernest Jones.[5]

We can realize, therefore, that the technique of psycho-analysis is difficult to acquire, and its application to any given case demands immense patience and an extraordinary expenditure of time. It is, perhaps, on this account that substantial criticisms of Freud's work have so far rarely appeared; few medical men are able to give the necessary time to form a proper judgment upon the matter.

Many *à priori* criticisms have been levelled at Freud's conclusions, and it has been said that the same amount of attention on the part of the physician would be attended by many recoveries apart from these special lines of investigation. The question also arises, how long the beneficial effects have lasted, as it is generally known that neurotic patients frequently are benefited for a time by a number of different agencies.

Criticism has, however, been chiefly directed to Freud's views on the importance of repressed sexual desires in the production of hysteria and other neuroses. Four propositions of his on this subject may be quoted: "The hysterical symptom—like all other psychic formations

—is the expression of a wish realization." "The hysterical symptom serves as a sexual gratification, and represents part of the sexual life of the individual." "The hysterical symptom, in a fashion, corresponds to the return of the sexual gratification which was real in infantile life, but had been repressed since then." "The hysterical symptom results as a compromise between two opposing effects or impulse incitements, one of which strives to bring to realization a partial impulse or component of the sexual constitution, whilst the other strives to suppress the same" (p. 197).

Whilst it will be admitted by all familiar with psychasthenics that the sexual factor is important, and that the memory of irregular practices may play a considerable part in the production of the symptoms, the perusal of a series of Freud's articles gives the impression that this is unduly emphasized. The hesitation that many feel in investigating the unpleasant details in the history of the patients, arises in large measure from the conviction that the revival of these memories may do positive harm in certain patients. Hart has pointed out that the value of psycho-analysis is by no means limited to this aspect of the subject. On the other hand, if Freud's methods enable the physician to understand the factors underlying troublesome and refractory disorders, as, indeed, appears to be established, the investigation must not be shirked, even though it leads to a line of enquiry which is distasteful.

In conclusion, it may be mentioned that Freud himself (p. 151) states that the treatment is not applicable to those who only undergo treatment at the wish of their friends, nor is it of service in persons over fifty years of age It is contraindicated in acute confusional states and in marked depression. Educated patients of good character, who are prompted by their own suffering to seek treatment, are the most suitable subjects.

REFERENCES.—[1]"The Psychology of Freud and his School," by Bernard Hart, *Jour. Ment. Sci.* July, 1910; [2]"Psycho-analysis in Psycho-therapy," by Ernest Jones, *Montr. Med. Jour.* Aug. 1909; [3]"Selected Papers on Hysteria," by Sigmund Freud, Vienna, Trans. by A. A. Brill, New York, 1909; [4]"The Practical Value of the Word Association Method in the Treatment of the Psycho-neuroses," *Ibid.* Nov. 1910; [5]"Freud's Theory of Dreams," in *Rev. of Neurol. and Psych.* Mar. 1910, by Ernest Jones.

PUBIOTOMY. *E. Hastings Tweedy, F.R.C.P.I.*

Pubiotomy (hebosteotomy) is an operation that has for its object the enlarging of the bony pelvis. On the Continent, and more recently in America, this procedure has obtained a firm footing, but, save in Dublin, it is held in disfavour by British obstetricians.

INDICATIONS.—It must not be supposed that pubiotomy is a panacea for all cases of obstructed labour due to pelvic contraction, for the enlargement of the pelvis gained thereby is distinctly limited. It may be relied upon for safe delivery in all cases of simple flattened pelves with a true conjugate measuring not less than $2\frac{3}{4}$ inches. In generally contracted pelvis it is not to be undertaken with a true conjugate less than $3\frac{1}{4}$ inches. If the conjugate is below these measure-

ments and the patient is seen early in labour with a living child, classical Cæsarean section is the operation indicated. If she is advanced in labour, with the membranes ruptured a long time, and a well-formed lower uterine segment, extraperitoneal Cæsarean section is the operation of choice if the child is alive (see page 226), and perforation if it is dead, unless the pelvis is too small to admit of delivery after perforation.

If the true conjugate measure 3¼ inches or more, the patient should always be allowed to go to full term and to fall into natural labour. A very large percentage of these cases will deliver themselves unaided if given time. If the patient has been allowed to fall into labour at full term, or is seen then for the first time, and the head fails to fix by its largest diameter, pubiotomy should be undertaken as soon as maternal or fœtal distress is manifested. These are the cases in which induction of premature labour, prophylactic version, and high forceps have been in the past, and still are, frequently recommended.

The forceps is an instrument unsuited for delivery if the head is not fixed in the brim by its largest diameter. Fœtal mortality is very high, maternal injuries are very common, and absolute failure to deliver frequently occurs. Before pubiotomy is performed, forceps should be used tentatively, as sometimes delivery is unexpectedly terminated by their help.

Fœtal mortality from version is very high, and increases with the degree of contraction. This means that the best results from version are obtained in minor degrees of contraction, and these are the cases that would most likely deliver themselves if not interfered with. For these reasons prophylactic version is a form of treatment that is rapidly and deservedly falling into disrepute.

The same objections apply to the induction of premature labour. In minor degrees of contraction it is not necessary, spontaneous delivery taking place in the great majority of cases ; and in the higher degrees of contraction, induction has to be undertaken so long before full term that the chances of the child surviving are not favourable. Fifty to seventy per cent of premature children die within the first year of life if labour is induced before the thirty-sixth week. If after this, the patient might with advantage be allowed to go to full term, as spontaneous delivery will almost certainly occur in a case where induction is not indicated until after the thirty-sixth week. When induction is justified it is where pregnancy goes beyond full term.

For these reasons, i.e., infant mortality, and the fact that the woman is not given a trial of natural labour to see if she can deliver herself, prophylactic version and induction of premature labour should be given up in favour of spontaneous delivery (which is often possible) and pubiotomy when necessary.

In a flattened pelvis with a conjugate measuring between 2¾ and 3¼ inches, spontaneous delivery of a normal-sized, full-term child is practically impossible. The choice lies between Cæsarean section and pubiotomy. If the patient is seen early in labour and uninfected,

particularly if the conjugate approaches the smaller measurement ($2\frac{3}{4}$ inches), Cæsarean section may be considered the more suitable operation, but pubiotomy is always safe in this degree of flattened pelvis. If the patient is seen late in labour, the choice lies between extraperitoneal Cæsarean section and pubiotomy, and depends to a large extent on the condition of the cervix and the size of the os. If distress is manifested before the cervix is taken up and the os well open, due to the fact that the membranes have ruptured early, pubiotomy is an operation of doubtful value. Delivery will necessitate tearing the cervix by artificial dilatation, which is a disadvantage. Extraperitoneal Cæsarean section would be a better form of treatment.

Pubiotomy, then, will have its chief indication in comparatively slight degrees of contracted pelvis where heretofore the disastrous operations of high forceps, prophylactic version, induction of premature labour, and perforation of the living child, have been employed. Future years will see these operations brought into requisition with less and less frequency, for pubiotomy is quite within the reach of the modern well-trained general practitioner.

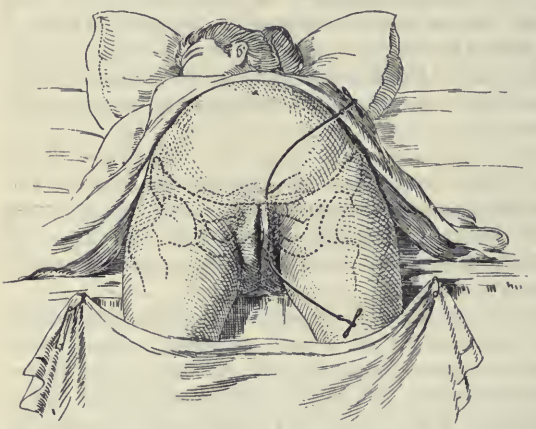

Fig. 56.—The position for Pubiotomy, showing points of ingress and egress of the pubiotomy needle and saw.

In conclusion, it is certain that estimation of pelvic size based on digital measurements and explorations cannot be relied upon. For accurate and scientific treatment, instrumental measurement of the pelvis is a fundamental necessity. Skutsch's pelvimeter will give results accurate to within one-fifth of an inch when employed by one accustomed to its use. The necessary skill is much more readily acquired than is the ability to estimate with even approximate accuracy by digital measurements, and once attained, the exactness of the measurements obtained by the pelvimeter makes it an indispensable preliminary to the proper treatment of every case of contracted pelvis.

Technique.—To avoid the most frequent complications, viz., hæmorrhage, laceration of the soft parts, injury to the bladder, and sepsis, the following details should be strictly observed :—

1. Strict asepsis. This comprises shaving and thorough disinfection of the vulva and area of operation. Unnecessary vaginal examinations should be avoided, the vulva should be carefully cleansed before each

examination, and the examiner should always wear a rubber glove. Throughout the operation and during delivery, the operator and all his assistants should wear rubber gloves.

2. The patient should be placed across the bed, and the legs allowed to hang down, as in Walcher's position (*Fig.* 56).

3. To avoid hæmorrhage and injury to the bladder, the needle (Bumm's) (*Fig.* 57) is kept close to the bone. It is plunged through the skin well outside the labium until the point reaches the lower border of the descending ramus of the pubes about three-quarters of an inch to the side of the symphysis. The left side is usually chosen. To get the labium well away from the point of insertion an assistant pulls it strongly towards the opposite side.

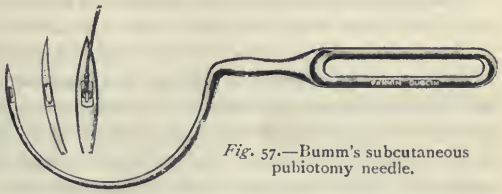

Fig. 57.—Bumm's subcutaneous pubiotomy needle.

4. Great care must be taken to make the needle hug the inner surface of the bone as it passes up behind the pubes to emerge through the skin above the crest about three-quarters of an inch to the side of the symphysis. This is the only difficult part of the operation, as the sharp needle evinces the greatest tendency to bury itself in the bone, which arrests its advance. The operator, in slightly withdrawing it and pushing it upward, may easily plunge the needle into the venous plexus around the base of the bladder, causing violent hæmorrhage, which will in a few moments burst its way through the vulval and vaginal mucous membrane, giving rise to the extensive and puzzling lacerations too frequently encountered. These lacerations communicate with the severed bone and constitute a formidable complication. In my eighth case such an accident occurred, for with unpardonable carelessness the needle was allowed to slip away from the bone. It pierced the bladder, and the hæmorrhage above described immediately followed. That the vaginal laceration had this origin was manifest, for blood spouted through it into the vagina before the severance of the bone was begun. Such a complication, though unpleasant, need have no serious consequence. Steady pressure with a finger in the vagina and the thumb outside the pubes so depresses the soft parts between the gap in the bones that further bleeding is impossible. The lacerations need not occasion great anxiety. The patient mentioned recovered uneventfully without fever, and the bladder symptoms subsided completely the next day, although for precaution's sake a wing catheter was left in for three days. Convalescence was not prolonged in any way. This case well illustrates the importance of not permitting the needle, during any part of its course, to get out of control, and this can be avoided by keeping one finger in the vagina to guard the point as it is passed upwards. For greater safety the operator may hold the curved part of the needle rather than the handle, so that free slipping is prevented by the hand striking the pubes.

5. When the needle emerges above the pubes, the saw is attached and brought into position as the needle is withdrawn. The severance of the bone is easily and rapidly done. The saw should be kept as straight as possible and its range of movement limited, as by these means laceration of the soft parts is avoided. Indeed, it is quite possible to work the saw so that the soft tissues, hugging it, move up and down with it, without any frictional contact.

The division of the bone is recognized in three ways: (1) The assistant, with his finger over the pubes, feels the division as soon as the bones are severed. (2) The operator feels the difference in the character of the resistance. (3) When the bone is almost severed, the operator should pull the saw towards himself, approximating the ends. In this way he gets an excellent idea of the amount of bone still to be severed. When the bone is cut through, the soft parts yield to the saw in a distinctive manner. It is advisable to have an assistant seated at each side of the patient's pelvis to prevent sudden separation of the bones, with possible

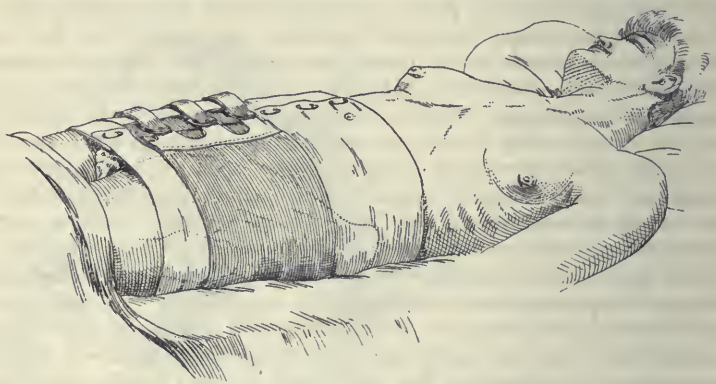

Fig. 58.—Method of applying belt after Pubiotomy.

laceration of the bladder and soft parts. In many of my cases the vagina has been plugged with pledgets of sterile cotton wool moistened in weak lysol solution. This plugging helps to dilate the soft parts, so that delivery is facilitated and lacerations are minimized.

Hæmorrhage should be very slight, and whether slight or severe can always be controlled by pressure.

Many obstetricians advise that delivery be left to natural forces, but I think this is a mistake, and it is to this delay that my one fœtal death is to be attributed. It seems cruel to permit an anæsthetized woman to recover consciousness undelivered, when delivery by forceps or turning is so easy after pubiotomy that nothing is to be gained by delay.

"After the third stage is completed, a compress of gauze is the only dressing required. The binder is applied as usual, and to give greater support, a broad canvas belt is placed around the trochanters outside the binder (*Fig.* 58). A navvy's belt answers the purpose admirably.

"The patient is turned from side to side in twelve hours, and can turn herself on the third day. On this day the bowels should be moved; for this the patient is elevated on to the bed-pan by the binder. This raising causes no pain, and the patient is always lifted in this manner when the draw-sheet is removed. When the binder is to be changed, it is slipped into the hollow of the back, the patient is raised by the belt, and a new binder laid under her. The belt is then slipped up and taken out, the patient raised by the binder, and the belt replaced outside the binder as before.

"The wound is completely healed within two to three days, and it is impossible to find the puncture mark after a short time."[1]

Prof. Döderlein, in a paper read before the Obstetrical Section at the 1910 meeting of the British Medical Association, strongly advocated the claims of the semi-open method which bears his name. With similar preparations an incision (preferably perpendicular, although the transverse is the one he recommends) is made above the pubes about ¾ in. outside the symphysis. This need be only long enough to allow the gloved finger to be passed down behind the bone to separate the bladder from the pubes. Döderlein's special blunt needle is passed from above downwards, hugging the bone and emerging beneath the descending ramus of the pubes three-quarters of an inch to the side of the symphysis. The labium is pulled strongly to the opposite side, so that the needle does not pierce the cavernous tissue. A small incision through the skin enables the point of the needle to be brought out. To this the saw is attached, and the subsequent steps of the operation differ in no way from the subcutaneous method. In the first of the five cases I performed in this manner the hæmorrhage was very free, and was caused in the same manner as in the case already mentioned, namely, injury of the prevesical plexus from neglecting to keep the needle close up against the bone. Döderlein aims at insinuating the needle between the periosteum and the bone. This can be done more readily with the sharp needle than the blunt, and if successful, it does not matter which needle is used, as practically no hæmorrhage will follow. In spite of Prof. Döderlein's advocacy of his method on the grounds that it is associated with less hæmorrhage and fewer injuries to the bladder, I have no hesitation in recommending Prof. Bumm's operation as the simpler and safer.

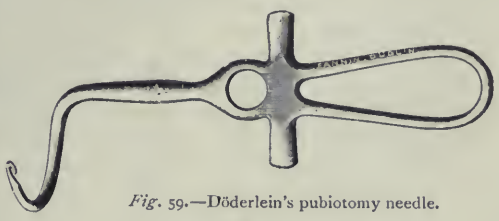

Fig. 59.—Döderlein's pubiotomy needle.

Remarks.—The following objections are considered by most British obstetricians to justify them in condemning pubiotomy. They, however, condemn it on purely theoretical grounds, and have little or no practical experience of the operation.

1. Fœtal mortality.

2. Maternal mortality, morbidity, and injuries more or less permanent. As causes of these unfortunate results may be mentioned hæmorrhage and sepsis following extensive laceration of the vagina, with exposure of the severed bone, and sometimes rupture of the bladder. Other unfavourable sequelæ are limping, due to fibrous union, neuralgia, hernia, and subsequent narrowing of the pelvis.

Each operator with an extensive experience of the operation has encountered some of these complications. Therefore, it cannot be said that the arguments urged against pubiotomy are without apparent foundation.

The advocates of the operation, in answer to these criticisms, maintain that the chief mortality and the occurrence of complications have resulted from inexperience, the operators having had limited opportunities of performing, seeing performed, or even of reading a clear and full description of the technique of the operation. Similar arguments were urged against ovariotomy in earlier days and, indeed, against almost all other surgical methods.

Maternal and fœtal mortality would be lessened if the operation were performed before danger symptoms of prolonged labour manifested themselves. At present the operation is often considered a last resort, but when its possibilities become better known, results will improve in consequence of the recognition of the proper time for its performance. It is obvious that the death of the fœtus can in no way be due to the operation, but to delay in resorting to it.

All complications are the result of faulty technique, and will disappear with greater experience. No other supposition will explain the occurrence of complications in one series of cases and not in another. It seems now only a matter of time before definite rules can be formulated to enable the careful obstetrician to operate with safety.

In Dublin, pubiotomy has been performed fourteen times, ten of the operations being in the Rotunda Hospital. There was no maternal mortality, and one child was born dead, the result of delay in delivery after the pubiotomy. The woman was left in the hope that spontaneous delivery would occur, but as there was considerable delay, a dead child was easily delivered with forceps. It was alive when the pubiotomy was performed.

Of my nine patients, all but the first got up on the fifteenth or sixteenth day, and walked the next day. They experienced no pain throughout the puerperium; there was no suppuration; they could turn themselves in bed on the third day; and they walked without discomfort and without limping. One of them had slight discomfort on locomotion for several months, but walked without pain or limping. Another complained of pain over the course of the sciatic nerve, but, as this did not come on until she was two weeks out of the hospital, it was probably not connected with the operation. Three have been delivered since, one by extraperitoneal Cæsarean section, and two naturally. Each of these patients had two normal labours after pubiotomy. Three were vertex presentations and one was a breech. These two

PLATE XXXIII.

PUBIOTOMY.

X-Ray January 7, 1911, Maurice R. J. Hayes, F.R.C.S.I.

C.S. Age 27. Fifth Pregnancy. Döderlein Pubiotomy, March 28, 1907. True conjugate 7½ cm., transverse 12 cm. Incision too far from symphysis: it went through the inferior ramus of the left pubic bone. It cannot be traced above. Bony union. A sixth and seventh pregnancy have followed, with delivery in each case of a living child.

PLATE XXXIV.

PUBIOTOMY.

X-Ray December 20, 1910, Maurice R. J. Hayes, F.R.C.S.I.

R.N. Age 30. First Pregnancy. Subcutaneous Pubiotomy, Nov. 5, 1909. True conjugate 8½ cm., transverse 12⅔ cm. There is a separation of about one centimetre between the two portions of the left pubic bone. Fibrous union.

PLATE XXXV.

PUBIOTOMY.

X-Ray January 7, 1911, Maurice R. J. Hayes, F.R.C.S I.

M.D. Age 24. THIRD PREGNANCY. Subcutaneous Pubiotomy, Sept. 13, 1910. True conjugate 8 cm., tranverse 12⅜ cm. The pubic articulation is indistinct, apparently from callus formation. Incision through the left pubic bone is visible, and shows bony union.

PLATE XXXVI.

PUBIOTOMY.

X-Ray November 24, 1910. Maurice R. J. Hayes, F R.C.S I.

M.C. Age 33. THIRD PREGNANCY. First and second labours, perforation. Subcutaneous Pubiotomy, Nov. 4, 1910. The line of incision through the bone is just visible. It is most distinct at its upper extremity. The fragments are in close apposition.

cases furnish the best argument that can be adduced against the statement that there is subsequent narrowing of the pelvis. Moreover, reference to *Plates XXXIII* to *XXXVI* (*x*-ray plates taken by Maurice R. J. Hayes, F.R.C.S.I., Radiologist, Mater Misericordiæ Hospital, Dublin) will show that there is no diminution in size, and in some cases that there is a decided potential, if not actual, increase. This latter statement applies particularly to the cases in which fibrous union has occurred.

Prof. Fehling[2] (Strasburg) in a paper read before the Obstetrical Section of the British Medical Association, 1909, advocated induction of premature labour in multiparæ, preferring to observe the course of spontaneous labour in primiparæ. Flattened pelves and slight cases of general contraction he considers suitable for induction. He chooses the time between the thirty-fifth and thirty-seventh week.

In cases where the pelvis is too small for induction, or the patient is seen for the first time in labour, he considers pubiotomy the best means for delivery, and indicated when danger to mother or child arises. For private practitioners in these cases, he recommends high forceps, followed by perforation if unable to deliver with forceps. In hospital practice he considers it unjustifiable to perforate a living child.

He performed thirty-two pubiotomies: seventeen by Döderlein's method, fifteen by Bumm's. One mother died two months later from *Bacillus coli* infection occurring after manual removal of the placenta. Twenty-seven children were born alive. He awaits spontaneous delivery when possible.

He considers relative Cæsarean section to be seldom indicated, particularly in a pelvis measuring 7·5 cms. or more. He prefers pubiotomy. The absolute indication for Cæsarean section is when the conjugate is 6·5 cms. or less.

Prof. Whitridge Williams[3] (Baltimore), in a paper read before the American Gynæcological Society in May, 1910, reports twenty-five cases of pubiotomy, with no maternal and three fœtal deaths, and reviews the literature.

In one case the Gigli method was used, and in twenty-four cases Döderlein's. He attributes freedom from bladder injury to Döderlein's technique and the choice of suitable cases (true conjugate 7 cms. or more). Immediate delivery followed pubiotomy in every case; in 20 cases the second stage was prolonged, and operation was undertaken because of distress. In 4 cases the cervix was not fully open; and in one, a transverse presentation, the second stage had lasted one hour. Manual dilatation of the soft parts was carried out before operation. There was one case of severe hæmorrhage, and five communicating vaginal tears. No bladder injuries. The patients were kept in bed three weeks; but this is now considered unnecessarily long. Fifty-six per cent had a temperature of 100·5° or over, but only one was seriously ill. Every patient walked without discomfort, and was able to work as well as before operation. One patient who had relaxation of the pelvic joints with painful locomotion during pregnancy,

had a persistence of this for some months after delivery. Williams re-examined twenty-one patients, and two wrote to him. They all expressed themselves well satisfied with the results. Definite motility was noticed in two-thirds of the cases.

Autopsy on a patient dying after Cæsarean section in subsequent pregnancy showed fibrous union, with enlargement due to softening and stretching, the result of pregnancy. Locomotion had not been impaired. Six patients became pregnant again, one twice, and the labours terminated spontaneously four times, by Cæsarean section twice, and pubiotomy on the other side once. This latter patient walked as well as ever after the second pubiotomy. Five patients had enlargement of the diagonal conjugate, and eight had increase in the transverse diameter of the outlet.

Six repeated pubiotomies are reported in the literature, five on the opposite side and one on the same side. Five reported autopsies on patients after recovery from pubiotomy, showed four with fibrous and one with bony union.

Williams also quotes Schlafli's report of 700 cases with a maternal mortality of 9·18 per cent and a fœtal mortality of 4·37 per cent. Analysis of these cases shows that 183 operations were performed by 108 operators, in itself a sufficient reason for the high mortality. Statistics giving a fairer idea of the results to be expected were those reported in 1907 before the German Gynæcological Society, when 19 operators reported 319 cases with six deaths, a mortality of 1·88 per cent. Since then there have been reported 199 cases with four maternal and eight fœtal deaths, a percentage mortality of 2 per cent and 4 per cent respectively.

Prophylactic placing of the saw is recommended in cases of breech or transverse presentations complicated by contracted pelvis.

C. W. Barrett[4] (Chicago), in a paper read before the Obstetrical and Gynæcological Section of the American Medical Association in June, 1910, reports six cases of pubiotomy with no fœtal or maternal mortality and no complications. Two cases showed fibrous union and separation ¼ to ⅜ ins. on the skiagraphic plate. The other *x*-ray plates were unsatisfactory. His technique is similar to the subcutaneous method of Bumm, except that he uses a blunt needle, and has to make small incisions to enter and bring it out. He thinks injury to the bladder is more easily avoided if the needle is blunt. In his opinion the operation is one that should be performed by any man sufficiently well trained to master the technique.

REFERENCES.—[1]E. Hastings Tweedy, "The Modern Treatment of Contracted Pelvis," *Proc. Roy. Soc. Med.* Mar. 1910; [2]*Brit. Med. Jour.* Oct. 9, 1909; [3]*Amer. Jour. Obst.* May, 1910; [4]*Jour. Amer. Med. Assoc.* Nov. 19, 1910.

PUERPERIUM, THE. *Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.*

Puerperal Sepsis.—Wilson,[1] in a long paper on the treatment of the graver forms of puerperal sepsis, points out that the percentage mortality is probably about 10. At present the recognition of the condition is made with reluctance, for fear of blame being imputed.

to the doctor or nurse by the half-informed laity. Prompt diagnosis, followed by segregation in a properly equipped hospital, is to be desired.

At the outset of the disorder he uses copious irrigation of the uterus with **Iodine Solution.** He prefers digital evacuation to the use of the curette, and is against the application of strong chemicals to the cavity. Of drugs, **Quinine, Alcohol,** and **Strychnine** are the most useful. Only in very high fever need sponging be performed; and antipyretic drugs are never to be advised. When septicæmia is evident, attempts have been made to reach the organism in the blood by **Intravenous Injection** of powerful germicides, such as collargol and mercury sublimate. He has used this method, and thinks it may be beneficial in early cases where the patient's resistance is still strong. The introduction of large amounts of water into the body, either per oram or by rectal or subcutaneous tissue infusion, is useful in supporting the embarrassed heart, diluting the toxins, and promoting excretion. The use of immune serums has not been a success in his hands, but he has seen benefit follow **Vaccine** treatment.

As regards surgical interference other than uterine exploration, **Free Drainage** of the pelvic peritoneum by multiple incisions is recommended by many authorities. He has tried Pryor's method of packing the uterus and pelvic peritoneal cavity with **Iodoform Gauze,** and has had results reasonably satisfactory. Hysterectomy is only indicated in sloughing myomata, certain cases of rupture, and suppuration of the uterine wall. The removal of the appendages is not usually advisable, simple drainage being safer and more efficient; but where definite collections of pus are present in the ovaries or tubes, they must, of course, be dealt with. The modern treatment by ligature or excision of thrombosed pelvic veins is rarely indicated. The most hopeful are those with intermittent fever and pulse and repeated rigors. He prefers the intraperitoneal route, because all the veins emissary from the uterus can be examined, and if necessary dealt with. In cases of pyæmia, collections of pus, whether in the pleuræ, joints, or peritoneal cavity, must be evacuated on ordinary surgical lines.

In the discussion that followed, most speakers fell in with Wilson's views. Tweedy insisted on the importance of early treatment. A. Smith advised abdominal **Drainage** and continuous **Irrigation** of the peritoneal cavity by saline solution. Lockyer had given up curettage, and instead swabbed the cavity with strong **Iodine Solution,** and packed it with iodoform gauze. He had a **Vaccine** made from the uterine contents, and in the case of streptococcal infection began with a minimal dose of $\frac{1}{10}$ million during a positive opsonic phase. Ligature of the pelvic veins might do good in some chronic cases. He believed in the administration of large doses of **Perchloride of Iron.** If the services of the bacteriologist and opsonist were always immediately available, many cases now fatal would be saved.

(For the use of **Phagocytin** as a prophylactic, see *page* 44.)

REFERENCE.—[1]*Brit. Med. Jour.* Oct. 9, 1909.

PURPURA. *Geo. Lovell Gulland, M.D.*
Alexander Goodall, M.D.

Etiology.—Hale White[1] gives a list of twenty-eight causal conditions. Rheumatism accounted for sixty-one out of 200 cases. Bright's disease as an etiological factor should not be overlooked.

Treatment should be directed towards the cause. **Oil of Turpentine** has been widely recommended in the unexplained cases, but its benefit is doubtful. Lime salts cannot be expected to do much good, since there cannot be purpura without disease of the walls of the blood-vessels. Indeed, lime salts cannot be said to lead to certain improvement in any form of hæmorrhage.

Reference.—[1]*Guy's Hosp. Gaz.* Feb. 1910.

PUS INFECTIONS (Pyodermatitis). *E. Graham Little, M.D., F.R.C.P.*

Dubreuilh and Brandeis[1] attempt a classification of this somewhat inchoate group of diseases of the skin. They recognize, as special clinical forms, *impetigo contagiosa*, commencing as a vesicle, quite superficial, and speedily forming yellow crusts; *Bockhart's impetigo*, affecting adults chiefly and consisting of a pustular folliculitis round a lanugo hair; *bullous impetigo*, commencing with bullæ, occurring chiefly in tropical countries, and merging into pemphigus; *ecthyma*, commencing with a pustule, which forms a thick crust covering a deep ulceration. Sabouraud laid it down somewhat dogmatically that the pus infections, vesicular in origin, were due to streptococcus (impetigo contagiosa and bullosa), and those which commenced as a pustule to staphylococcus. Dubreuilh and Brandeis cannot confirm this beautifully simple division: in impetigo contagiosa, e.g., they found, with equal frequency, pure staphylococcus, pure streptococcus, or a mixture of both; and they conclude that the varieties described above give no indication, from clinical appearance alone, of the organism chiefly concerned in their production.

Reference.—[1]*Ann. de Derm. et de Syph.* June, 1910, p. 323.

PYELITIS. *Francis D. Boyd, M.D.*

Much attention continues to be directed to acute pyelitis due to the *Bacillus coli* infection (see *Medical Annual*, 1910, p. 514). In discussing the condition in children, Thomson[1] points out that the clinical features show an extreme severity of the general symptoms and a very trivial and equivocal nature of the local symptoms. The children are obviously very ill, but there is nothing distinctive to be found, beyond a little pus in the urine. The general symptoms show pyrexia, rigors, convulsions, and faint turns, great general disturbance and distress, quickened respiration, vomiting, drowsiness, and possibly delirium. The local symptoms are very slight, or apparently even absent. The characteristic features of the urine were that it contained a number of pus cells and clumps of *Bacillus coli* and was distinctly acid. Three facts which are important from a clinical point of view require mention: (1) At the time the temperature first rises no pus is often (per-

haps ever) to be found in the urine. It always appears, however, within a few days. (2) The pus may, at a later stage, disappear from the urine for a day or two and then reappear. This is probably due to one ureter being mainly affected at the time, and to its having become temporarily blocked, while the other remains patent. (3) Although the urine is acid on passing, it tends rapidly to become alkaline on standing. One is apt therefore to become misled if one tests the reaction of urine which is not freshly passed.

The main indications for treatment are two. The first is to ensure a copious discharge of urine, which is effected by giving fluids freely, by the mouth if possible, and if not by the rectum (saline enemata). The second, which is the most important, is to render the urine alkaline on passing and to keep it so for a time. This is done by the administration of **Citrate of Potash,** or some other alkaline remedy. The dose of citrate required varies greatly in different cases. The smallest found effective was 24 gr. in the day. It is advised that 48 to 60 gr. should be the initial dose in the day, and be increased to 120, 150, or even 180 gr. if the urine remains acid. The time required to render the urine neutral or alkaline varies with the dose of the medicine and the severity of the case. The state of the bowels may influence the action of the citrate, for if diarrhœa be set up the effect of the citrate on the urinary reaction will be diminished. Generally the urine becomes alkaline in four or five days.

From the study of the charts and records of his own and other published cases, the author considers that certain generalizations are justified: (1) When an alkali is not given, or is given in insufficient doses, the case may recover, but the course is apt to be protracted. The risk of relapses and of extension of the disease to the kidney under these circumstances is probably considerable. (2) If the kidneys have become seriously affected by the time the treatment is begun, the alkali does not reduce the temperature, and neither it nor anything else seems to do any good. (3) When, in an uncomplicated case of acute pyelitis, an alkali has been given in sufficient amount to render the urine alkaline on passing, the temperature always falls to normal or nearly normal, within a day or two at most. Along with the fall in temperature the general symptoms improve, and the pus disappears from the urine, though a pure culture of *B. coli* may sometimes be got from it for weeks or even months after. (4) Even if the alkali be pushed, there is generally a tendency for the urine to become acid again a few (three to seven) days later, and with this the temperature rises and the other symptoms return. In some cases this secondary rise is severe, in some slight, in some it does not occur. (5) The author has never seen a case of acute pyelitis in a young infant in which other organisms were found along with *B. coli*. In cases of mixed infection in older children, however, the use of citrate of potash in large doses has never seemed to do good, and usually has appeared to be positively harmful.

In the case of *adults,* Hanna Thomson,[2] discussing the treatment of the invasion of the kidneys by *B. coli*, speaks very highly of **Urotropin**

if combined with **Benzoate of Soda.** He admits that other observers have failed to obtain benefit from urotropin, and that it may at times produce strangury if given alone, but if combined with sodium benzoate he has never found it fail.

Dudgeon and Ross,[3] in acute cases of coli bacilluria, claim excellent results from the **Anti-bacillus Coli Serum** given in doses of 25 cc. spread over seventy-two hours. In chronic and subacute cases vaccines prove most useful. It is important to prepare the vaccine from the patient's own micro-organisms. The vaccines are killed by heat, and it is rare to find two strains of *B. coli* killed by exactly the same temperature. It is uncommon for constitutional symptoms to follow the administration of a coli vaccine. The injection should be intramuscular rather than subcutaneous, and the site of inoculation should be varied. After treatment of over 100 cases they find that in the acute ones complete recovery is the rule under vaccine therapy; but in chronic forms complete recovery, i.e., a sterile urine, is the exception, though in most cases considerable improvement took place. After trying different methods of dosage, they conclude that small doses, 100 to 200 million bacilli every five days, give the best results. Billings[4] uses a larger dose, and in his experience reaction both local and general is common. Hartwell and Streeter,[5] from experience of a number of cases in the Massachusetts General Hospital, conclude that vaccines are efficient in relieving symptoms in mild forms of cystitis, but are without value in severe forms; that they probably hasten the recovery from pyelitis, but that they have no influence on bacteriuria.

References.—[1]*Quart. Jour. Med.* Ap. 1910; [2]*N.Y. Med. Rec.* May, 1910; [3]*Ann. Surg.* Mar. 1910; [4]*Amer. Jour. Med. Sci.* May, 1910; [5]*Bost. Med. and Surg. Jour.* Mar. 1910.

PYORRHŒA ALVEOLARIS. *Robt. Hutchison, M.D.*

This condition continues to attract much attention; but there is, perhaps, a tendency to exaggerate its possible consequences to health. Turner,[1] for instance, enumerates the following remote diseases which may reasonably be ascribed to it: Corneal ulceration, perhaps by direct infection by the fingers; cyclitis; keratitis punctata and secondary cataract (Dr. Lang); meningitis; septic gastritis, enteritis, colitis; gastric ulcer; pancreatitis; jaundice from inflammatory blocking of the bile-duct; gall-stones; hepatitis; appendicitis; anal fistula—all by direct surface infection from an infected intestinal stream; inflammations and suppurations of joints—gout, rheumatism; epiphysitis; empyema of chest; nephritis and perinephritic abscess; neuritis; inflammation of the fibrous tissues—lumbago, gout, rheumatism; toxæmia or bacterixmia; lupus erythematosus; malignant disease of intestine; Addisonian anæmia — an important factor (Hunter); and septic pneumonia. He adds that he believes this list could be largely extended!

Accounts of the Morbid Anatomy and Pathology of pyorrhœa are still very confused and, strictly speaking, the condition so-termed is only one phase of what may be comprehensively spoken of as "oral

sepsis." As Turner points out, stagnation at the necks of the teeth—germ or germ-food stagnation—is the factor which makes alveolar infections so common. Once access has been obtained, the first result is the appearance of a slight gingivitis at the margin of the gum. From this, in greater or less degree, few adults in this country are exempt. By a spread of the infection, the alveolar bone and periodontal membrane become involved, and suppuration sets in; finally, the sockets of the teeth are destroyed, the gums shrink, and the teeth loosen and fall out. The deposition of tartar, and the invasion of the tooth itself through the apical foramen, complete the picture of "oral sepsis." The micro-organisms concerned in the process are staphylococci, streptococci, diphtheroid bacilli, the *Micrococcus catarrhalis*, and sometimes pneumococci.

Colyer[2] has shown that pyorrhœa is not confined to man, but occurs also in many of the lower animals, especially when kept in a state of captivity or domestication.

Treatment.—**Extraction,** according to Turner, is the safest, and, in hospital practice, the only treatment. Local treatment, short of extraction, should aim at **Drainage.** This may mean destruction of pockets, alternate extraction, or some modified form of alternate extraction, in order to leave the remaining teeth in a better state for drainage. Every tooth must be thoroughly scaled, if necessary right up to its apex. The hordes of micro-organisms must be got rid of; mechanical cleansing by means of a solution of citric acid in 1–40 carbolic acid (to make use of its inhibitive action) is very effective in this direction, but it must be applied to every minutest recess with actual force, not merely allowed to flow in. Peroxide of hydrogen is often used with the same idea, that during frothing germs are mechanically carried out of the pockets; but it seems to fall far short of actual rubbing with a wisp of cotton-wool soaked in citric-acid solution, and carried on an iridio-platinum probe. Bicarbonate of soda 10 gr. to the ounce of 1–40 carbolic may be employed in the same way. Sometimes 1–40 carbolic "burns" the mouth, and 1–60 must be substituted. The patient, or his doctor, may rub the *necks of the teeth and edges of the gums* with a bit of lint pulled over the end of a finger and dipped in the lotion. When, in order to save the teeth, it is necessary to avoid destruction of pockets, seeking rather to tighten the gums round the teeth, after preliminary cleaning a 10 to 15 per cent solution of sulphuric acid may be introduced into the pocket, allowed to remain for about a minute, and then be killed off with bicarbonate of soda. A similar use of sulphuric acid may be useful in early marginal cases.

Goadby[3] considers that antiseptics are of little avail, and mouth-washes never gain access to the sockets, unless they are forcibly applied by means of a fine-nozzled syringe. He recommends **Vaccine** treatment, the organism or organisms chosen for the vaccine being those to which the patient's blood shows an abnormal opsonic index. The drawback to this method of treatment is its tediousness.

References.—[1]*Pract.* Jan. 1910; [2]*Lancet*, May 7, 1910; [3]*Ibid.* Dec. 25, 1909.

QUINSY.

Pineapple Juice as a ferment for dissolving necrotic tissue in (*page* 45).

RECTUM, DISEASES OF. *Sir Chas. B. Ball, M.Ch., F.R.C.S.*

The method by which Mr. Sampson Handley has endeavoured to demonstrate the dissemination of cancer has, especially when applied to the rectum, attracted considerable attention. In his Hunterian Lecture[1] Handley describes his method as follows—"Owing to the tendency of abdominal cancers to undergo mucoid degeneration, it is very difficult to identify the degenerate cells with certainty when they occur sparsely or in small groups. But if mucicarmine—a specific stain for mucin—is used to stain the sections, the presence in tissues, from which epithelium is normally absent, of cells or débris stained red, affords conclusive proof of cancerous invasion. In such tissues mucicarmine is a specific stain for cancer cells—not indeed for healthy and active ones, but for those which are already dying or dead."

The case upon which Mr. Handley founds his observations, so far as cancer of the rectum is concerned, was one of moderate size, freely movable, and which had not obviously spread to the surrounding pelvic structures. Ten inches of bowel were removed, and for six inches above the growth there was no macroscopic evidence of cancerous infection. A longitudinal strip of the entire 10 inches was examined microscopically. After staining with mucicarmine, it could be seen that, extending from the tumour along the bowel in both directions, cancer cells, isolated, or in small groups, or small masses of mucus representing degenerate epithelial cells, lay in the plane of tissue between the blind ends of the Lieberkuhn follicles and the muscularis mucosæ. Some of these cancer masses were obviously in endothelium-lined cavities. They decreased in number and size as the distance from the original growth increased, but were present where the bowel was divided above, and therefore probably extended much higher. Close to the growth these masses could also be detected below the muscularis mucosæ, and at this point the subperitoneal lymphatic spaces showed evidence of permeation.

Handley concludes from these observations that permeation of the lymphatic plexus in the mucous membrane occurs early and to a very considerable extent, and that excision of a long piece of bowel above the growth and below it, down to and including the sphincters, is a right practice; yet even with these precautions it is probable that some lymph spaces infected with cancer are left behind.

The publication of these observations evoked a lengthy correspondence in the *British Medical Journal*, and the question as to whether the abdominal operation or the combined method should be adopted to the exclusion of the perineal and transacral routes was raised by some surgeons. Important papers upon this subject have also been published elsewhere. A review of these publications by no means shows unqualified acceptance of Mr. Handley's contention. In the first place, further evidence that this apparent spread of infection, as

indicated by the mucicarmine method of staining, is in reality cancerous permeation, is required; for this purpose a larger number of observations corrected by efficient control examinations is obviously necessary. Secondly, if the isolated case brought forward is typical of others, excision of the rectum, together with the largest possible lymph area, is not likely to result in permanent cure. As pointed out, however, by several surgeons who have large experience in this subject, clinical experience does not bear out Mr. Handley's views.

Cancer of the rectum tends rather to spread into the tissues immediately surrounding the bowel, than to appear as secondary nodules along the course of the intestine, as would almost certainly be the case if Mr. Handley's contention were generally true. Recurrence of the disease, after removal, in the vast majority of cases, is in the pelvic tissues surrounding the rectum, or in the mucous membrane close to the point at which the bowel was divided, and metastatic growths are more common in the liver than is recurrence in the abdominal lymphatic glands. This is forcibly shown by the statistics from Hochenegg's clinic:[2] in 135 cases which recovered from the operation, 25 per cent were alive and well after three years, and of the cases which were known to have recurred, in 72 per cent the recurrence was local, in 24 per cent as metastatic growths, and in the lymph-glands in only 4 per cent.

Those who still advocate the perineal or sacral route in suitable cases point out that the immediate risk is very considerably less, and that hitherto statistics show that the proportion of rapid recurrence is not greater than when the combined operation has been performed. On the other hand, the advocates of the combined method claim that hitherto only the more extensive cases have been treated in this way, so that it is natural to expect a higher rate of mortality and a large number of rapid recurrences.

Probably one of the strongest arguments in favour of preliminary abdominal section is the fact, as pointed out by Hartmann (*vide infra*), that in the perineal and sacral operations the superior hæmorrhoidal artery is of necessity divided below the last connecting loop with the arterial system of the pelvic colon, and consequently necrosis of the intestine somewhat frequently results, whereas in the abdominal operation the superior hæmorrhoidal artery is divided above this loop, and the vitality of the rectum is thereby insured. On the whole the tendency of modern surgery appears to favour preliminary abdominal section, as it affords opportunity of determining the extent of the disease, the presence or absence of metastatic growths in the liver or elsewhere, and allows accurate hæmostasis, while at the same time providing for the blood-supply to the lower portions of the rectum, freer removal of diseased areas, and easier mobilization of the rectum without bruising.

Cancer of Rectum.—Henri Hartmann,[3] writing on high amputation, details some valuable observations on the blood-supply of the rectum, based upon researches made in his laboratory by de Dietrich. The

superior hæmorrhoidal artery descends almost in a straight line from the aorta through the trunk of the inferior mesenteric artery; it is surrounded at the back of the pelvis by tough fibrous tissue continuous with the pelvic fascia, and unless the superior hæmorrhoidal artery is divided together with this fascia, it is not possible to draw down the rectum after amputation so as to leave a healthy portion fixed to the perineum without undue tension. He points out the wide difference there is between the arteries of the rectum and the rest of the intestine: in the latter there is a series of anastomosing loops in the mesentery near its insertion into the intestine, while anastomosis between the branches of the superior hæmorrhoidal arteries on the rectum are trivial or absent altogether. The injections which de Dietrich has made indicate: "(1) That the ligature of the inferior mesenteric artery does not affect the circulation of the rectum, provided it be done between its origin and the giving off of its last important collateral branch, which arises from 1 to 1½ cm. below the promontory (see *Fig.* 60). (2) That the ligature of the terminal portion of the inferior mesenteric below this last collateral branch produces almost or even complete suppression of the arterial supply of the rectum and of the rectosigmoid junction. The suppression is so much the more complete, since in the course of the perineal amputation one separates the lower part of the intestine from its peripheral connections, and since one cuts consequently the branches of the middle hæmorrhoidal artery—an accident less important, indeed, than the descriptions in recent treatises on anatomy would lead us to suppose. (3) That ligature of the trunks of the superior hæmorrhoidal artery, right and left, causes suppression of the circulation in corresponding sides of the rectum. In a way, the superior hæmorrhoidal arteries answer to the type of terminal arteries.

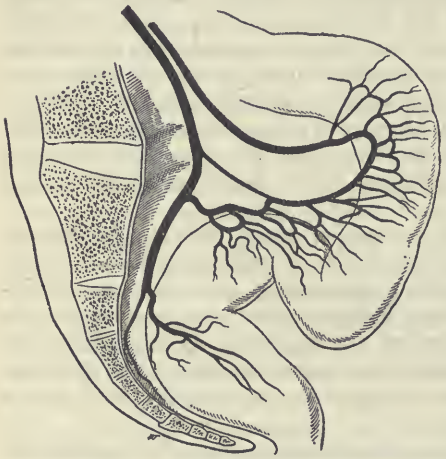

Fig. 60.—*Arterial Circulation of the Rectum.*—Note the difference in the arrangement between the arteries of the pelvic colon, which form an anastomotic loop, and the superior hæmorrhoidal arteries, which present no important anastomosis. Note the constant situation of the last anastomotic loop, a little below and to the left of the promontory.

"The results of these researches, in great part confirmative of those published two years ago by Sudeck,[4] are that if the operator wishes to have an intestine which may be brought down to the level of the skin of the perineum without traction, and still well nourished, it is necessary to avoid cutting the hæmorrhoidal arteries at the point where one is

led necessarily to divide them when working exclusively from the perineum. It is necessary to place a ligature high up on the common trunk of these arteries above the last anastomotic loop, which, as we have said, is found a little lower than the promontory, and it is necessary to tie both ends, the blood flowing back in abundance by the inferior end. In consequence of not having done this last ligature, we have lost a patient from hæmorrhage.

"The necessity of making this high ligature of the hæmorrhoidal pedicle obliges one to begin the operation through the abdomen, whereby the advantage is gained of being able to divide immediately, along the sides of the rectum, the peritoneum and the subjacent fibrous tissue which, with the hæmorrhoidal pedicle, forms the chief source of fixation of the upper part of the rectum. The same path will be utilized also to strip up from in front whatever infected connective tissue surrounds the rectum, blood-vessels, lymphatics, and glands. At the same time, while the operator will be protected from the danger of secondary gangrene, he will have accomplished an extirpation much more extensive than by the ordinary procedures through parts which may be invaded by the cancer. This done, he will have only to finish the operation by isolating through the perineum the lower part of the rectum, as one does for low amputations of this segment of the intestine, and to bring it down until the outside portions shall be manifestly healthy. This is possible in a great majority of cases without the least traction, in consequence of the straightening out of the sigmoid flexure. However, when the meso of this loop is short, the intestine may be seen to descend vertically into the pelvis, like a clock pendulum, isolated on all sides, which is a bad condition for ultimate cure. The intestine ought, at the end of the operation, to be in contact with the neighbouring parts, resting directly on the

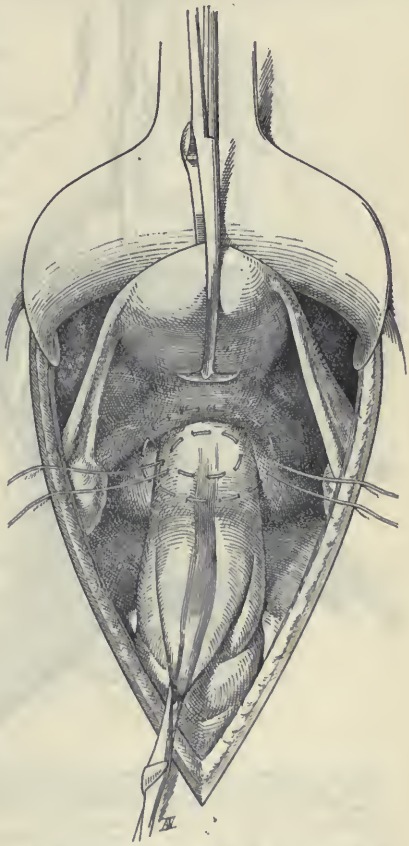

Fig. 61.—First stage of colopexy in the female: obliteration of cul-de-sac of Douglas.

sacral concavity and following its curvature in such a manner that it may readily and quickly become adherent to the neighbouring parts. To accomplish this in cases of shortness of the meso-sigmoid, it is necessary to incise the peritoneum alongside the colon in such a way as to mobilize downward and toward the median line the intestine with its vascular meso preserved intact. One may also cut the intestine across, fix its upper end in an iliac incision, and extirpate the lower end in totality.

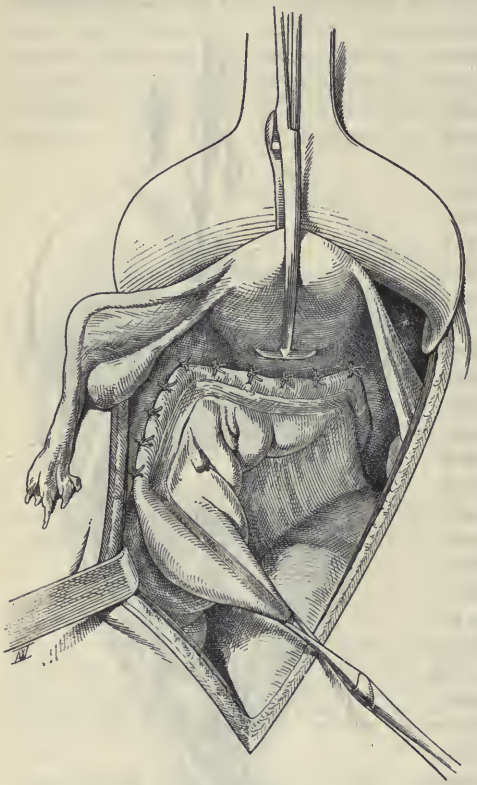

Fig. 62.—Second stage of colopexy in the female. The colon is sutured transversely from the right broad ligament across the cervix uteri to the left broad ligament, and thence obliquely up to the brim of the true pelvis.

"By following the technique that we have just indicated, the operator is able to prevent gangrene of the end of the intestine, and will make a much wider removal of the cancerous growth along the lymphatic paths, realizing what one might call, by analogy with the operations recently done for uterine cancer, wide ablation of cancer of the rectum."

Removal of Rectum for Cancer. — W. J. Mayo[5] gives the results of operations on cancer of the rectum performed in St. Mary's Hospital, Rochester, U.S.A., for the period between April, 1897, and December, 1909; 120 cases are tabulated, and of these 38 were done by the perineal route, 56 by the sacral, and 26 by the abdominal combined route. The mortality was 20 = 16 per cent. One hundred and nineteen of the cases proved to be carcinoma, and only one sarcoma.

Late results: Operation more than five years ago, 32; present condition known in 17; alive and well, 4. Operation more than four years ago, 41; present condition known, 26; alive and well, 8. Operation more than three years ago, 60; present condition known, 43; alive and well, 13.

With regard to the dissemination of the disease, Mayo says, "While it cannot be said that too much attention has been paid to the

lymphatics in carcinoma of the rectum, it can be truthfully asserted that too little attention has been given to the local extension of the disease. In our experience, inoperable conditions, as a rule, have been due to hopeless local extension rather than to lymphatic metastasis. I could go further, and say that I have seen more cases in which embolic carcinoma of the liver has been the contraindication to excision of a locally removable disease than has irremovable glandular metastasis.

"Of the 120 cases, 63 were males, with 11 deaths, and 57 females, with 9 deaths. Of the 60 cases operated upon more than three years ago, there were 29 males and 31 females. Of the 13 alive and well, 5 were males and 8 females.

"Sepsis was the cause of the highest percentage of operative mortality. The rectum contains the most virulent organisms at all times. As pointed out by Hochenegg, the fæces in the fluid state are not only filled with bacteria, but are mechanically difficult to control, and he therefore advises clearing out the intestinal tract at least forty-eight hours before operation, allowing the intervening time to enable the intestines to become quiet. For the same reason Kammerer and others advise a preliminary and usually a permanent colostomy in order that the lower fragment may be cleansed and freed from fæcal contamination before the radical operation, which is made one or two weeks later.

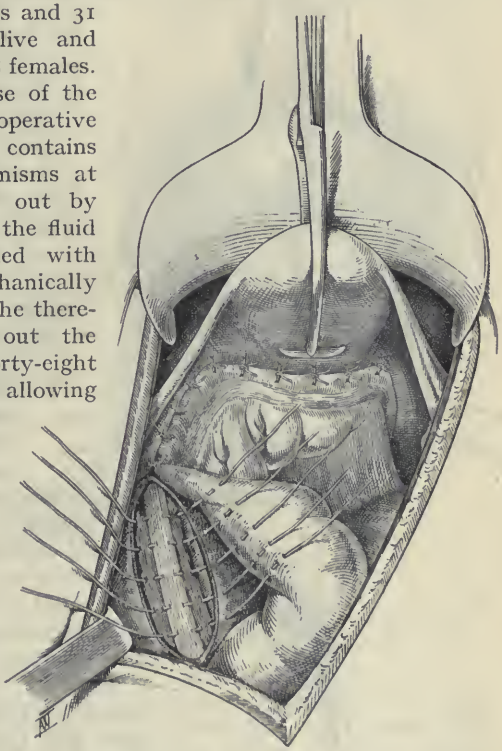

Fig. 63.—Colopexy in the female. Shows the final sutures in position for fixing the colon to the iliac fossa.

"A great many surgeons practise closure of the anus with circular sutures, and take every precaution to prevent leakage during operation. Peck has made a valuable contribution to the technique in advising temporary closure of the proximal bowel after operation. The closed end of the stump is fastened into the anal space and left closed for forty-eight hours or more until union takes place. In some of our cases union was primary, two patients leaving the hospital three weeks after extensive resection, with completely healed wounds and with moderate muscular control.

"If catharsis had not been used for at least forty-eight hours before operation, it was surprising how long complete obstruction could be maintained without great discomfort to a patient who had been kept on a diet of albumen-water, broths, etc. In one case, a woman, we were able to maintain complete closure for seven days, and complete closure for three, four, and five days was not uncommon following operation.

"The 120 cases have been divided into three groups, which have been classified, according to the means of approach, into: (1) Perineal operations; (2) Posterior operations of the Kraske type; (3) Abdominal operations of the combined type. Up to the present time we have not chosen any one operation to which we unhesitatingly give preference in all cases. In making a choice of operations we are influenced in individual cases by the situation of the tumour, age, and general health of the patient, and especially as to whether there is a great quantity of adipose tissue. The abdominal method in the very obese, especially males, is attended by a considerable mortality, much higher than with the employment of either the perineal or the posterior route."

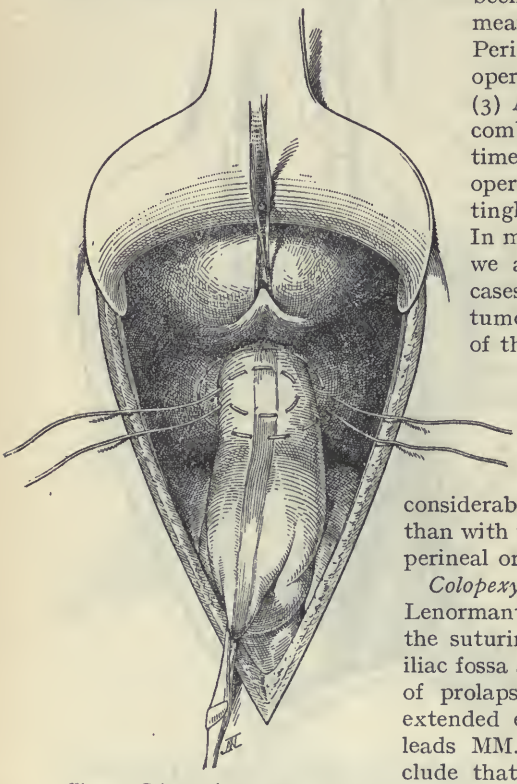

Fig. 64.—Colopexy in the male. Obliteration of the recto-vesical pouch.

Colopexy in Prolapse of Rectum.—Ch. Lenormant in 1907 advocated strongly the suturing of the pelvic colon to the iliac fossa as a cure for extensive cases of prolapse of the rectum.[6] A more extended experience of this operation leads MM. Quenu and Duval[7] to conclude that recurrence of the prolapse after this method might be obviated by a more elaborate technique, in which the pouch of Douglas is obliterated at the same time as a longer piece of pelvic colon and rectum is sutured to the parieties. The operation is as follows:—

The patient being placed in high Trendelenberg position, the abdomen is opened by median incision below the umbilicus. In the female the uterus is drawn upwards and forwards with a forceps, and the prolapsed rectum fully reduced by traction on the pelvic colon. The peritoneal cul-de-sac of Douglas is now obliterated by means of two sutures passed

at different levels (*Fig.* 61). The rectum is sutured to the pelvic peritoneum so as to lie horizontally from right to left, the lowest portion is fixed by interrupted suture to the right broad ligament, and a series of 8 to 10 interrupted sutures fix the bowel to the back of the vagina and to the left side of the true pelvis up to the brim (*Fig.* 62). An incision is now made in the iliac fossa outside the iliac vessels and exposing the iliac fascia and tendon of the lesser psoas muscle; fine sutures are passed through the peritoneal coat of the pelvic colon, through the right side of the peritoneal incision, and through the iliac fascia and tendon of the lesser psoas muscle; these sutures, when closed securely, fix the pelvic colon (*Fig.* 63); the left free edge of divided peritoneum is then stitched to the colon. In the male a somewhat similar operation is recommended: the recto-vesical pouch of peritoneum is closed by sutures in the same way as the pouch of Douglas is obliterated in the female (*Fig.* 4), the free border of the rectum stitched to the back of the bladder horizontally from right to left, and the pelvic colon fixed to the iliac fossa (*Fig.* 65).

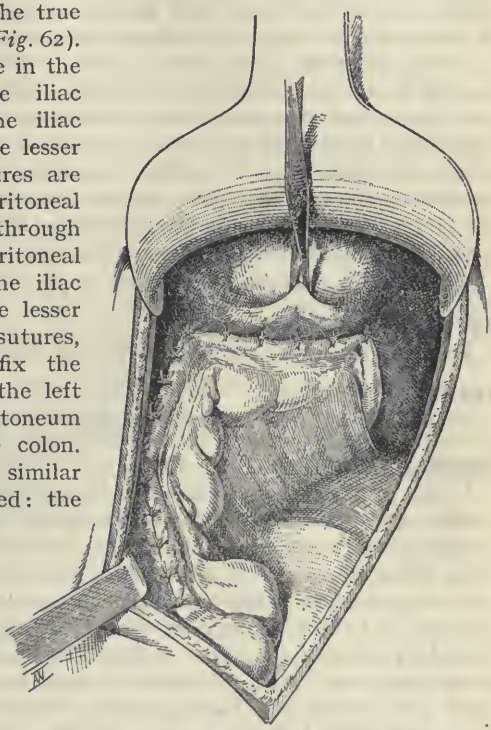

Fig. 65.—Colopexy in the male. Fixation of the intestine completed.

References.—[1]*Brit. Med. Jour.* Ap. 16, 1910; [2]Quoted by E. W. Hey Groves, *Brit. Med. Jour.* June 11, 1910; [3]*Ann. Surg.* Dec. 1909; [4]*Münch. med. Woch.* 1907, pp. 13, 14; [5]*Ann. Surg.* June, 1910; [6]*Med. Ann.* 1908, p. 468; [7]*Rev. de Chir.* Feb. 10, 1910.

RECTUS MUSCLE, WOODEN PHLEGMON OF.

Priestley Leech, M.D., F.R.C.S.

Reclus first described this condition in 1896 in connection with the cellular tissue of the cervical region. Antonio Duse, of Brescia,[1] describes a case in a boy, fifteen years old, who four months before had been operated on for double inguinal hernia; the wounds suppurated, and two and a half months later he noticed the development of a hard mass in the upper left quadrant of the abdomen, which produced a feeling of weight and stretching. The mass gradually increased in size. At the commencement, a small incision was made in

the mass, and only a small amount of sanguineous fluid escaped, and the mass continued growing, the small wound healing by first intention. After he came under Duse's care another incision was made, with the same result. A small piece of the tissue was excised, from which bacteriological cultures were made, and a histological examination. A *Staphylococcus albus* was isolated, which on injection in guinea pigs gave no reaction. The tissue itself showed newly-formed inflammatory tissue and abundance of plasma cells. From a study of this and other cases he comes to the conclusion that ligneous phlegmon is clinically a form of chronic inflammation due to microbes ; the microbe is not a specific one. (C. Löffler's bacillus, and a pseudo-diphtheritic bacillus of attenuated virulence have been found.) One factor in its production seems to be the attenuated virulence of the infective agent. He gives a bibliography of other writings on this subject.

REFERENCE.—[1]*Gaz. deg. Osped.* May 17, 1910, No. 59.

RECURRENT FEVER.

Arsacetin injections, in 20 per cent. sol. (*page* 11).

RELAPSING FEVER.

"606" stated by Iversen to be specific (*page* 18).

RETINA, DETACHMENT OF THE. *A. Hugh Thompson, M.D.*

Useful summaries of recent work on this subject have been published by Ernest Thomson[1] and by Casey Wood,[2] with full bibliographies. In diagnosis the essential point is to distinguish simple detachments from those secondary to intra-ocular tumour, and this is not always easy, for a tumour often causes detachment, not only in its immediate vicinity, but in other parts of the retina, and the intraocular tension is seldom perceptibly raised in the early stage of a tumour. If there is the slightest doubt, we ought to keep the case under observation until none remains. Taking simple detachments, the prognosis is admittedly bad, but Deutschmann claims to have cured as many as 70 out of 267 patients whom he submitted to operation, a remarkably high percentage compared with the experience of most surgeons. By "cure," moreover, he states that what is meant is an anatomical reattachment of the retina which has persisted for two years after the last operation. On the other hand, the general experience of the result of treatment, whether operative or not, is very much less favourable than this, and since a certain small proportion of cases undergo a spontaneous "cure," some are inclined to doubt whether treatment has any influence on the condition. In discussing this subject, one cannot help thinking that too much stress is often laid on the question whether there is or is not a complete anatomical reattachment. From the practical point of view, what concerns the patient is whether or not the affected eye is going blind. Every ophthalmic surgeon must know of cases in which the symptoms resulting from a detached retina have undergone spontaneous improvement without anything like a complete reattachment taking place. Such a condition may persist for several

years. Moreover, even highly skilled ophthalmologists have been known to differ as to whether a reattachment is or is not complete. Even if it is, the eye is by no means safe, for the slightest over-work or strain is only too likely to cause a relapse. The questions that are really most pressing, therefore, in a case of detached retina are (1) Is it likely to lead rapidly to complete blindness? and (2) Can treatment of any sort help to avert this calamity, and if so, what treatment? If the detachment is very extensive, if the vitreous is full of opacities, if there is high myopia or much choroiditis, the prognosis is bad. If, on the other hand, the detachment is small, if the vitreous is clear, and there is neither high myopia nor much choroiditis, prognosis is much better. A recent detachment is more likely to be cured than an old one; but an old one is more likely to remain stationary than a recent one. A known cause of a purely temporary nature, such as a blow, or the albuminuria of pregnancy, is a favourable element in prognosis. Cyclitis often causes detachment, and if the cyclitis can be cured the detachment may become stationary, at any rate for a number of years. Suppose, then, that we have one of these less hopeless cases to deal with, the following are the lines of treatment open to us :—

1. **Rest.**—Complete rest in bed for weeks at a time, varied by daily removals to a couch with precautions against any exertion, and above all against straining at stool. The position should be the prone one, and, if the patient will stand it, both eyes should be bandaged.

2. **Pilocarpine Injections** to induce sweating are sometimes used, but the depressing effect of this treatment, added to the depression incident to the disease, is such that it is rarely wise to employ it.

3. **Subconjunctival Injections.**—There is a very general impression that this method does good, though the *rationale* of it is not understood. The absorption of the subretinal fluid has been thought to be favoured by a process of osmosis, but most authorities think it more likely that the subconjunctival injection acts merely as an irritant. The best systematic evidence we possess with regard to this method is in a paper by Maitland Ramsay,[3] giving the results in 50 unselected cases, nearly half of whom appeared to derive some benefit. The following were the solutions employed by him :—

(*a*). Sodii Chlor. (chemically pure) 8 per cent.
Sol. Hydrarg. Bicyanid. 1–2000.

(*b*). The same, with Quinine 1 per cent added.

(*c*). Dor's Fluid :—

Sodii Chlor.	.. ..	grams 5·00
,, Carb.	.. ..	,, 0·40
,, Sulphat.	.. ..	,, 0·40
,, Phos.	.. ..	,, 0·10
Potass. Sulphat.	.. ..	,, 0·40
Aq. dest. ..	.. ..	ad ,, 20·00

The quantity injected is from 5 to 20 min. and the injection may be repeated in from 4 to 6 days, or when the conjunctival œdema which always follows an injection has subsided.

4. **Scleral Puncture**—evacuation of the subretinal fluid. This procedure is the simplest of the operations undertaken for detachment. It is recommended by Ramsay in conjunction with subconjunctival injections and rest. By this mixed treatment Ramsay holds that a good result may be expected in 10 per cent of all cases.

5. **Iridectomy.**—A few surgeons have practised this, but on what principle, unless it is for the sake of doing something, it is hard to see.

6. **Cauterization.**—The object is to secure an inflammatory attachment between choroid and retina. The most hopeful way of doing it appears to be by the galvano-cautery introduced between the lips of a scleral puncture. This procedure is rational, but may be attended by excessive inflammatory reaction. A successful case was reported by Paton.[4]

7. **Deutschmann's Operation**—"bisection of the vitreous and retina." —Deutschmann passes a narrow two-edged knife not merely into the sub-retinal pocket, but right through the vitreous to a counter-puncture of the sclera on the opposite side, apparently puncturing the detached retina itself *en route*. The *rationale* of this procedure in so far as it differs from an ordinary scleral puncture is not evident, and the author of it admits that possible mischances may occur, such as the puncture of a large retinal vessel or the lighting up of a previously existing intraocular inflammation. The results claimed, however, are better than those of any other method, 70 out of 267 patients having been cured and 94 improved, leaving only 103, or 38·7 per cent, admitted failures. The treatment for many of these patients must, however, have been very prolonged, for the author speaks of doing a second operation in ten to fourteen days after the first, and repeating it as many as from ten to twenty times. Moreover, the numbers dealt with in this way did not include the most severe cases, 68 of whom were treated by injection of sterile animal vitreous, with a resulting cure in 3 cases and improvement in 26.

Hirschberg, of Berlin, in a recently published work on myopia[5] relates four cases of detachment where an anatomical reattachment, which lasted for as long as ten years, was observed clinically, there having been no operative treatment. In each of these cases the scar of the old detachment was visible ophthalmoscopically, being marked by a disturbance of pigment. Another case in which scleral puncture was performed, remained with an anatomical reattachment and useful vision for eighteen years. The non-operative treatment recommended is complete **Rest** of the body in the recumbent position, and of the eyes; the internal administration of **Iodide of Potash** or of **Soda**; moderate **Sweating** twice a week, but preferably not by means of pilocarpine injections; and subconjunctival injections of **Salt Solution**, first of physiological strength, increased gradually to 2 per cent. He does not think it necessary to bandage the eyes, and the only operative procedure that he speaks of with approval is simple **Scleral Puncture.**

REFERENCES.—[1]*Ophthalmoscope*, June, 1910; [2]*Jour. Amer. Med. Assoc.* July 23, 1910; [3]*Trans. Ophth. Soc.* 1906; [4]*Ibid.* 1908; [5]*Kurzsichtigkeit*, Berlin, 1910.

RETINITIS PIGMENTOSA. *A. Hugh Thompson, M.D.*

In a lecture on retinitis pigmentosa by Doyne,[1] the following are the main points. The well-known symptoms are: (1) Night blindness; (2) Pigmentation of a lace-like pattern towards the periphery, leaving the periphery itself normal; (3) A ring scotoma; (4) Small vessels and waxy disc. In addition to these there will generally be found (5) A zone of greyish infiltration of the retina inside the zone of pigmentation; (6) A thin layer of fine vitreous opacities in the form of threads, lying over the retina; (7) Cataractous changes in the lens which begin in the capsule at the posterior pole. As the disease progresses, the scotoma advances and the field diminishes, but central vision remains good both for form and colour, contrary to what occurs in optic atrophy. The diagnosis has to be made from some cases of choroiditis and syphilitic retino-choroiditis in which pigmentation of a very similar type occurs. As to the pathology of the disease, nothing certain is known; but Doyne suggests that the symptoms point to an exudation from the retina, the elimination of which through the lymph channels which accompany the vessels is difficult. The difficulty leads to a choking of the vessels near the disc, which accounts for the waxy disc and diminution in calibre of the vessels, and also to choking at the commencement of the venæ vorticosæ which leads to the peripheral pigmentation.

Treatment.—Benefit is said by Doyne to be derived from the **Raw Retinæ** of sheep and oxen given as food. If the disease causes the retina to be starved of blood, possibly these may supply in a concentrated form the constituents of the blood which it chiefly lacks. In cases where the lens has become affected, the results of **Extraction** are remarkably good. Doyne mentions two cases in which there was merely a little degeneration of the posterior capsule of the lens, which did not prevent the details of the fundus from being plainly visible. In both these cases the improvement of vision after extraction of the lens was out of all proportion to what might have been expected.

Reference.—[1]*Ophthalmoscope*, Sept. 1910.

RHEUMATIC ARTHRITIS.

Ionic Medication with sod. salicyl. (*page* 33); and with lithium iodide (*page* 95).

RHEUMATISM. *Robt. Hutchison, M.D.*

That *rheumatoid* arthritis is in many cases due to chronic septic absorption is now well recognized, but it is beginning to be believed that true rheumatism has often a similar origin. Schichhold,[1] for example, holds that the presence of septic foci in the tonsils is largely responsible for the production and maintenance of acute rheumatism; and he speaks of what he calls the "tonsillar treatment" of that disease, which consists in complete enucleation (not mere amputation) of the tonsils; and this he carries out, not only as a prophylactic against further attacks, but even during the course of acute rheumatic

arthritis. No one who sees much of acute rheumatism in children can doubt that there is a good deal of truth in Schichhold's view; and the present writer has for long been convinced of the importance of removing adenoids and enucleating the tonsils in children who have suffered from acute rheumatism, and regards these measures as affording considerable protection against subsequent returns of the disease.

Wynn Wirgman and Watson Turner,[2] approaching the subject from the same point of view, lay stress on the part played by "pyorrhœa" in the production, not only of rheumatism, but even of "gout." They cite several cases in which "rheumatic" or "gouty" symptoms have disappeared coincidently with the removal of pyorrhœa. Most of these, however, would fall rather under the heading of "fibrositis" than of true rheumatism.

Mosler[3] describes several cases of rheumatic inflammation of the serous membranes (so-called "polyserositis rheumatica"), an affection which he believes to be commoner than formerly. The pericardium and pleuræ are usually affected, often simultaneously, and either in association with inflammation of the joints, or in rheumatic individuals in whom articular affection is absent or inconspicuous. The pleurisy and pericarditis usually set in suddenly and together, but the urgent symptoms (dyspnœa, orthopnœa, etc.) are due to the pericarditis. The pleurisy leads to exudation, which, however, usually clears up without puncture; the pericarditis is dry. Endocarditis and myocarditis are common accompaniments, and it is the latter that alone renders the disease dangerous. For treatment, he believes in small doses of **Morphia** to relieve the dyspnœa, with **Digalen, Camphor,** and **Caffeine** to prevent dilatation of the heart. He considers **Antipyrin** in small frequent doses the best anti-rheumatic. The prognosis is better the longer the patient has passed the age of puberty.

(For the use of **Neraltein** in rheumatism, see *page* 42; for **Vaccine** treatment, *page* 61.)

REFERENCES.—[1]*Münch. med. Woch.* No. 6, 1910; [2]*Lancet*, Dec. 4, 1909; [3]*Berl. klin. Woch.* Feb. 14, 1910.

RHEUMATISM, CHRONIC. (*See* FIBROSITIS.)

RHINOSCLEROMA. *E. Graham Little, M.D., F.R.C.P.*

This is so intractable a disease that it is interesting to read the report[1] of a cure which was permanent for more than three years. The patient was an Austrian woman, aged thirty-seven; the diagnosis was confirmed by microscopical examination. After various surgical attempts at amelioration, Pollitzer tried **X-rays,** with which a marked improvement resulted in two weeks; after six weeks the intranasal infiltration had vanished. About twenty exposures had been made with a medium-hard tube, at 8 to 10 cms. distance, for five or six minutes.

REFERENCE.—[1]*Jour. Cutan. Dis.* Aug. 1910, p. 388.

RICKETS.

(*Vol.* 1910, *p.* 533)—**Calcium Salts** are recommended by some; **Phosphorus** and **Cod-liver Oil** assist the body to take up and use the calcium of the food. The following prescription is advised: Elixir Phosphori ℥v, Ol. Morrhuæ ad ℥ij: ℥ss t.d.s. p.c.

RINGWORM. *E. Graham Little, M.D., F.R.C.P.*

The *Lancet*[1] commissioned "two thoroughly competent dermatologists" to report on the position of ringworm in London. Their report forms interesting reading. Comment is made on the enormous proportions of the disease and the universal assent of dermatologists that the **X-ray** treatment is the most satisfactory method of dealing with it. Favus, which began to assume rather startling frequency in London by reason of the immigration of aliens, from Poland chiefly, was practically stamped out by the institution of *x*-ray treatment at a preliminary reception-place for these aliens; and the same end might be achieved for ringworm if adequate *x*-ray centres were provided. Of the methods of administration, the single-exposure system, controlled by the change in colour of properly-made Sabouraud pastilles, is recommended in preference to the older multiple exposure method without this control. The "five area naked method" associated with Adamson's name is probably the best; by this method the whole head can be epilated in five—or at the most six—exposures. There is no danger of injury to the brain tissues in children with closed fontanelles. (See also *page* 78.)

Reference.—[1]*Lancet*, Jan. 1, 1910.

ROCKY MOUNTAIN SPOTTED FEVER. (*See* Spotted Fever.)

RODENT ULCER.

Radium in (*page* 83, 89).

SARCOMA.

Radium in (*page* 86).

SARCOMA (Multiple Hæmorrhagic Idiopathic).

E. Graham Little, M.D., F.R.C.P.

This disease, known also as "Kaposi's disease," usually ends fatally by metastasis of the malignant process to viscera. **Arsenic** has been used in many cases with some benefit, but often with none. Wallhauser[1] reports two cases treated by local application of bichloride of mercury (1–2000, ultimately increased to 1–500) in compresses. In the first case the lesions disappeared after four months; the patient was again seen two years later, and showed no recurrence then. In the second case, the tumours were pared down under cocaine anæsthesia and then dressed with bichloride compresses in the same way as in the first case, and cure apparently resulted within six months. She was seen a year later, and then showed no return. Nearly four years later a new growth was found in the thigh. She had lived precariously, suffered from alcoholism, and was much wasted. The new growth had appeared six months before the final

admission, and the patient died of chronic interstitial nephritis, as shown by autopsy. There were no metastases of malignant cells. Histological examination of the tumour from the thigh showed an infiltration of the deeper layers of the corium with round and spindle cells; the epidermis and papillæ were thinned by pressure from the mass growing towards the surface. The wall of the vessels showed proliferative changes. The sarcomatous nature of the tumours is not universally accepted.

REFERENCE.—[1] *Jour. Amer. Med. Assoc.* Nov. 13, 1909.

SCARLET FEVER. *E. W. Goodall, M.D.*

CLINICAL.—Two cases of rupture of vessels of the neck into the pharynx in scarlet fever are reported by J. Howell Griffiths and D. F. Riddell.[1] In one case, a boy aged nine years, the cervical glands became inflamed, in the fourth week after a mild attack of scarlet fever. Inflammation and suppuration of a deeply-seated gland involved the internal jugular vein on the right side. While digital examination was being made of a swelling that presented behind the right tonsil, sudden, profuse, and uncontrollable hæmorrhage took place, and the patient died in about a minute. The second patient was a boy, aged three years. There was a rather severe attack of scarlet fever, with faucial ulceration. During the fourth week of illness, when the faucial lesion seemed to be nearly healed, while the child was sitting propped up in bed taking some rice pudding, he gave a sudden cough, which was followed by profuse arterial hæmorrhage from the mouth. He died almost immediately. Post-mortem dissection showed that a deep-rooted gland had undergone suppuration, and the inflammatory process had involved the internal carotid artery, which had given way. The blood escaped through the abscess cavity in the gland and the wall of the pharynx.

[Fortunately in these days, when scarlet fever is so mild, complications such as this are very rarely met with. But in the course of years I have seen more than one similar case; and when there is deep ulceration about the fauces there is always a risk of this accident.—E. W. G.]

DIAGNOSIS.—W. T. Corlett and H. N. Cole[2] give an account of three outbreaks of scarlet fever at the Lakeside Hospital, Cleveland, U.S.A., in which several of the cases were anomalous. The chief anomaly was the indefinite character of the rash, which was absent in some cases, slight and atypical in others. Yet, now and then there was a case presenting all the common features of the disease. The diagnosis was difficult, but was aided by the presence of the occasional typical case. The authors lay stress on the increased leucocytosis of the blood, with a high percentage of eosinophiles. In a summary of the literature of the subject, it is pointed out that cases of the kind described have long been known, more especially in Europe.

[At the present day scarlet-fever is only mild, no matter in what part of the world it occurs; hence the cases described by Corlett and Cole are by no means uncommon. But it is important to bear in mind that scarlet-fever, anomalous in so far that the rash is absent, may be

very severe and even fatal. Such cases are usually confused with diphtheria.—E. W. G.]

TREATMENT.—Since the paper[3] upon which I commented last year was published, the subject of the treatment of scarlet fever by inunction of the skin with **Eucalyptus Oil** and by the application of 1-20 **Carbolic** to the tonsils has been brought before the profession in two communications by Robert Milne: one being a paper read before the Royal Society of Medicine,[4] and the other a small book.[5] In these publications he has added some fresh instances of the application of his method and its results, or, rather, what in his opinion are the results. I have read both these papers very carefully, and I can see no reason to alter what I stated last year upon the question, namely, that I am not convinced of the soundness of his conclusions. Take one of the new instances he gives. I quote from his book (p. 24): "In November and December, 1908, nine cases of scarlet fever occurred in nine different cottages at the Girls' Village Home. All of these had the carbolic oil and eucalyptus treatment from the first symptoms, most of them in their individual cottages. Two, however, for greater convenience, were treated in the general wards of the infirmary cottages. The other children in the cottages were allowed to visit them daily. After ten days the patients were out of bed and mingling freely with their companions in their respective cottages. They also attended, with 1300 other children, without restriction, both day school and church. The local medical officer of health watched the progress of the treatment with the keenest interest. . . . The ages of the patients were from eight to sixteen years. The cottages in which they lived were widely apart from one another. In every instance the symptoms were definite from the beginning, and in the later stages every single case had well-marked peeling. I have embodied certain dates and comments in the subjoined table:—

	Date of Attack	Case Notes	Condition as to Peeling
1	Nov. 2, 1908 ..	Severe throat and rash ..	Heavy
2	,, 5 ,, ..	Slight at first, then well-marked	Freely
3	,, 5 ,, ..	Throat and rash severe ..	Heavy
4	,, 10 ..	Well-marked	Freely
5	,, 10 ,, ..	,, ...	,,
6	,, 12 ,, ..	,, ...	,,
7	,, 13 ,, ..	,, ...	,,
8	,, 20 ,, ..	,, ...	Heavy
9	,, 12 ,, ..	Most severe	Very heavy

"After these nine, no fresh cases occurred until the following:—

10	Feb. 5, 1909	15	May 11, 1909	20	Aug. 5, 1909
11	,, 6 ,,	16	,, 11 ,,	21	,, 21 ,,
12	April 3 ,,	17	June 19 ,,	22	Sept. 9 ,,
13	,, 8 ,,	18	Aug. 5 ,,	23	Oct. 2 ,,
14	May 6 ,,	19	,, 5 ,,	24	,, 4 ,,

"Every case had all the symptoms of scarlet fever pronounced, followed by well-marked peeling. Perhaps I ought to direct special attention to the fact that these occurred in eighteen different cottages and in the receiving-house. There were three cases in the latter and in one of the cottages, while in both of these, as well as in another cottage, two cases occurred on the same day.

"None of these cases were isolated, for they were, with one exception, with other children all the time, and in ten days among 1300 other children. . . . One of the above cases was a child four years of age. The symptoms appeared on the day following her admission to the Home. The temperature rose to 103·8° F., and the symptoms were very severe. On the eleventh day, when peeling most freely . . . . she was constantly at play . . . with some 69 other children in the Home, sixteen of whom were under four years of age. . . . At the end of the fourth week this child was seen by the medical officer of health with some fifty children at dinner under the trees in the open air. She was carefully inspected by him. Her hands were peeling most freely in large patches. In spite of this mingling together, however, with so many children of such tender years, no other case occurred."

These are the essential facts of this outbreak as given by Milne himself. He has previously told us that the Girls' Village Home, at Barkingside, comprises 67 cottages, with a receiving-house. There are 1300 girls resident in the homes, of whom 70 may be in the receiving-house. Three cottages were, at the time Milne wrote, utilized as an infirmary. He does not state how many children each cottage holds, but if all the cottages are of the same size, with 1200 to 1300 girls in the village there would be an average of about 19 girls to a cottage (excluding the cottages used for the infirmary and the receiving-house).

The exact ages of the girls are not given, but the ages of the first 9 patients were from eight to sixteen years; and in the extract given above of 69 children in the Home (apparently this refers to the receiving-house), 16 were under four years of age. It is important in an exact enquiry to know the proportion of children amongst the 1300 who were under five years of age. It is also most desirable to have information how many of the children had previously had scarlet fever.

Now I venture to read this outbreak as follows, according to the information supplied by Milne. On Nov. 2nd to 5th, 1908, three cases of scarlet fever occur in three different cottages; I suppose that in all three cases the infection was introduced from outside, though, in the absence of any evidence to the contrary, cases 2 and 3 may have caught the disease from case 1. The interval of time between case 1 and cases 2 and 3 is the normal incubation period of scarlet fever. These three cases are submitted to the approved treatment, and no isolation is enforced. Accordingly, there are two more cases on Nov. 10th, one on Nov. 12th, another on the 13th, and another on the 20th. After an interval of twenty-two days another case occurs. These children are not isolated; they are allowed to be seen by other children. It

is well within the limits of probability that cases 4 to 9 caught the disease from cases 1 and 3. After the case on Dec. 12th, there is not another till Feb. 5th; and at intervals from Feb. 5th to Oct. 5th, 1908, there are 15 cases; and it is worthy of note that they occur in little groups of two or three. Now we are told that the first nine children were kept in bed for ten days, at the expiration of which time they were allowed to get up and mingle with the rest. During their most infectious stage, that is to say, they are in bed; later, when they are less infectious, they are allowed to mix with others. Consequently, after an interval of some duration (Dec. 12th to Feb. 5th), we begin to get the disease cropping up in other parts of the village, for we are expressly told that eighteen different cottages were affected. I submit that this is not an unusual example of a village outbreak of scarlet fever. Now let us consider this outbreak from another point of view. From Nov. 2nd, 1908, to Oct. 5th, 1909, there were 24 cases of scarlet fever, that is, 24 cases in eleven months; but as we are informed that no more occurred before the end of October at any rate, we will say 24 in a year. From these we will exclude the first 3 cases, as having been introduced from outside. We will also exclude the 3 cases that occurred in the receiving-room, though we are not sure that we ought to exclude more than one of them. That leaves us 18 cases. These 18 cases occur in a population of 1300 children, most of whom, we gather, are between the ages of four and sixteen years. This is an attack- or case-rate of 1·38 per cent, and if this case-rate is compared with those of London, it will be found to be by no means low; it is not possible to make an exact comparison, because the ages of the 1300 girls are not given. If there is a large proportion above the ages of eight or ten, then the attack-rate for the Barkingside Village Homes was high. Strictly speaking, too, if we are to compare the attack-rate of this Village Home with that of any other community, we should include all the cases, 24. If we do, the attack-rate becomes 1·8, which is distinctly on the high side.

But it may be said that the cases were not isolated, and if the eucalyptus treatment was of no avail, there should have been very many more cases. That raises another question. Even if we admit that a case-rate of 1·3 to 1·8 per cent is not above the average (and I am inclined to think it is), we have to consider the question of the infectivity of scarlet fever. There can be little doubt that this varies from time to time, and there are reasons for believing that by many medical men it is much overestimated; and I am quite ready to admit that Milne and some of his predecessors have demonstrated that in very many cases infection does not remain about the patient for so long a period as has been believed. But, as I wrote last year, it has not been shown that the eucalyptus treatment has anything to do with the loss of infectiousness.

If a comparison is instituted between the attack-rate of the Barkingside Village Home, and that of other communities, it should be pointed out that "the village stands in its own grounds of 64 acres and is

beautifully laid out"; and again, the cottages in the village are "widely separated from one another." These are conditions which are in favour of a low attack-rate. The children, too, are under fairly close supervision. There is a mother to each cottage. Yet, as I have shown above, the attack-rate is not low.

In the discussion[6] which followed the reading of Milne's paper at the Royal Society of Medicine, some instructive evidence on the other side was brought forward by more than one speaker. Thus, F. M. Turner, Medical Superintendent of the South-Eastern Fever Hospital, stated that he had employed the method on patients suffering from scarlet fever; yet in spite of that, some of them proved to be infectious after their discharge from the hospital. He remarked that as regards the prevention of return cases the experiment was a partial, if not a total, failure. Nor did he find that the method prevented the spread of scarlet fever in hospital; he had tried it on scarlet-fever patients in the diphtheria wards, and some of the diphtheria patients had caught scarlet fever. He also found that patients not suffering from scarlet fever who were treated by Milne's method and placed amongst scarlet fever cases, caught scarlet fever. This experience occurred also to Biernacki, of Plaistow, who further stated that the incidence of complications was not lessened by the treatment. There is another point, hardly touched on by the speakers at the meeting in question, though it must have been well known to all of them, and that is, that it is by no means uncommon to have a patient suffering from scarlet fever (in a form unrecognized) in a diphtheria ward for several days, and even two or three weeks, without the eucalyptus treatment, and the diphtheria patients will not catch scarlet fever. As Crookshank remarked in the above-mentioned discussion, "The superintendents of such institutions (i.e., isolation hospitals) do not admit that scarlet fever spreads with extraordinary rapidity when the patients are kept in bed, with the observance of certain simple rules."

Jochmann and Michaelis[7] report a few cases, which appear to have been very successfully treated by a combined method of injection of **Antistreptococcic Serum** and **Antistreptococcic Vaccine.**

Prophylactic.—The prophylactic treatment of scarlet fever by means of a **Vaccine** is the subject of a most interesting paper by Richard M. Smith[8] (Boston, U.S.A.). He begins by referring to Stickler's observations[9] in 1883. Stickler "took the blood of a scarlet-fever patient and injected it into himself, and in three days had an eruption like scarlet fever, followed by desquamation. Then he took the desquamated scales from a scarlet-fever patient and injected them into healthy individuals, causing no reaction except a local hyperæmia, but if later the people received injections of blood from a scarlet-fever patient, there was no eruption or desquamation. This method never received much recognition." [Was it not because Stickler's experiments were not conducted in such a way as commended them to the medical profession ?—E. W. G.]. So it is not till 1905 that we hear

of any further efforts towards finding a vaccine against scarlet fever. In that year Gabritschewsky reported the use of streptococcus vaccines. Smith informs us that Gabritschewsky first began his researches by working on horses with the disease known as strangles, due to a streptococcus, and simulating in many ways scarlet fever in man; the results were so encouraging that he then attacked the problem in human beings, first injecting himself with the vaccine to be sure no unfortunate results would follow, then making wider applications.

For making the vaccine Gabritschewsky used a concentrated bouillon culture of the streptococcus isolated from a person ill with scarlet fever. The culture was killed by heating it to 60° C., with the addition of 0·5 per cent carbolic acid. Each cc. of this culture contained 0·02 to 0·03 cc. of sediment; of this 0·02 equalled 0·005 gram of dried sediment. The vaccine has been used by two methods as regards dosage. Gabritschewsky used 0·5 cc. of the concentrated bouillon culture for children of two to ten years; for those under two, half, for adults twice this amount was used. The other dosage is 0·1 cc. for each year of the child's age, with 0·25 cc. as the minimum and 1 cc. as the maximum. The vaccination should be repeated twice at seven- to ten-day intervals, and the dosage increased at each injection one and a half times to twice the previous dose. There are certain contra-indications to the vaccination. It should not be practised upon (1) Those who have a high temperature (though recently such cases have been vaccinated without untoward results); (2) Very young infants or patients who are in a state of exhaustion, whatever the cause; and (3) Persons having nephritis.

It is claimed that after three injections of the vaccine, complete immunity is established against scarlet fever. But the "duration of this immunity is entirely a matter of speculation, as the vaccines have been in use too short a time to make any definite deductions possible."

In the majority of cases a slight local inflammation follows the vaccination: sometimes there is headache, malaise, and vomiting. In a few cases, twenty-four hours after the injection a punctate erythema appears all over the trunk, and there is sore throat and cervical adenitis. "Rarely there may be a rather severe condition, with high fever, a little albumin in the urine, and marked prostration; but it rapidly disappears, without permanent harm." In a few cases there is no reaction, local or general.

An account is given of a number of instances in which this vaccine has been used as a prophylactic in outbreaks of scarlet fever in several towns and villages in Russia; and it is upon the results obtained in these cases that the statement as to the immunity caused, given above, is based. As an instance, the following may be cited, furnished by Nikitrin. Of 528 persons vaccinated once, 8 caught scarlet fever subsequently; of 106 vaccinated twice, and of 149 vaccinated three times, none caught the disease. In the villages in which no

vaccination was done, 16 per cent of the children took scarlet fever; in the villages vaccinated, 1·4 per cent. Smith concludes: "From these published accounts it would seem that (1) The streptococcus vaccines, used as advocated by Gabritschewsky, have some influence in controlling epidemics of scarlet fever; (2) Their influence, with proper care, is attended by no harmful results; (3) They should be given a wider application in this country [U.S.A.] to prove or disprove the contentions of the Russian physicians.

A very full bibliography is appended to this paper.

References.—[1]*Glas. Med. Jour.* Jan. 1910; [2]*Jour. Amer. Med. Assoc.* July 16, 1910; [3]*Brit. Med. Jour.* Oct. 31, 1908; [4]*Proc. Roy. Soc. Med.* Dec. 1909; [5]*A Plea for the Home Treatment of Scarlet Fever* (James Nisbet & Co. 1910); [6]*Proc. Roy. Soc. Med.* Dec. 1909; [7]*Berl. klin. Woch.* May 16, 1910; [8]*Bost. Med. and Surg. Jour.* Feb. 24, 1910; [9]*Med. Rec.* 1883, xxiii. 316, quoted by R. M. Smith.

SCHISTOSOMIASIS. *J. W. W. Stephens, M.D.*

N. D. Drayton[1] records the occurrence of 104 cases of *S. hæmatobium* on the Isthmus of Panama. The cases seem to have been derived from Guadaloupe and Martinique principally, and to a less extent from Antigua, Trinidad, Demerara, Barbados, and Jamaica. Porto Rico is also an infecting centre. The author records some important cases which bear on the question as to whether eggs with terminal and lateral spine respectively, belong to the same worm or to two different species. In the first case, terminal-spined eggs were found in the fæces, but no eggs at all in the urine. In the second, lateral-spined eggs were found in the urine and in the fæces. The patient was a lunatic female. There was no evidence of the existence of any fistula.

E. R. W. Frank[2] describes the cystoscopic examination of two cases of bilharzia in soldiers in London. In the first, an early case, the bladder mucosa appeared to be firm and thick, and on it in places were very fine granulations covered with sand (sandy bladder). In another portion there were excrescences like a hen's comb or crest, and in other parts tuberosities with broad bases. On one of these was a yellow structure resembling an acne-pustule; in other parts there were small white shining pustules. Through these pustules the eggs escape. The second case showed tuberosities as big as a pea or nut, and here and there small white cicatrices evidently calcified. The region of the ureteral opening was thickened, streaked with cicatricial tissue, and there were also small pustule-like spots.

H. S. Houghton[3] states that the distribution of *S. japonicum* is China (Hunan, Honan, Hupeh, Kiangsi, and Anhui provinces), Japan, Singapore, and the Philippine Islands. Eight per cent of all males in Wuhu general hospital were infected. Farmers and boatmen are peculiarly liable to invasion. Clinically, the cases may be classified into: (1) Typical cases showing enlarged liver, hydroperitoneum, and bloody stools; (2) Cases showing splenic enlargement with or without blood in the stools; (3) Cases negative except for marked eosinophilia; (4) Latent cases showing ova in the stools but no bodily

reaction. It is pointed out that ova are not always easily found. Eosinophilia ranges from 10 to 50 per cent. Exaggerated knee-jerks occur in practically every case.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Ap. 30, 1910; [2]*Deut. med. Woch.* May 19, 1910; [3]*Jour. Trop. Med.* June 15, 1910.

SCIATICA.

(*Vol.* 1910, *pp.* 530, 544)—**Bee Stings** are said to have a curative effect. **Injections** into the sheath of the sciatic nerve are recommended by Purves Stewart; the technique is described in the 1910 *Annual*. Normal saline, with or without β-eucaine ·1 per cent, is to be preferred to alcohol, as the latter may cause sciatic paralysis.

SCLERODERMA. *E. Graham Little, M.D., F.R.C.P.*

New interest has been aroused in this disease by the observation first made by Lustgarten that the Wassermann reaction was frequently positive. Whitehouse[1] has collected seven cases of scleroderma, five diffuse and two circumscribed: in the first series of five, three gave a strongly positive, one a faintly positive, and one a negative reaction; the two latter cases had had antisyphilitic treatment for undoubted syphilis. The two circumscribed (morphœa) cases gave a negative reaction; five of the seven tests were made by Dr. Noguchi, and all were tested with the original Wassermann as well as by later modifications. The question whether scleroderma should be regarded as giving the reaction because it is really syphilitic or because it is one of the few diseases, not syphilitic, which give it (e.g., leprosy, yaws), is considered, and decided by Whitehouse in favour of the hypothesis that scleroderma is syphilitic in origin.

Kanoky and Sutton[2] endeavour to place the rare disease known as acrodermatitis chronica atrophicans, so named by Herxheimer. This is characterized by an atrophy of the skin of the fingers, usually ushered in by a purplish thickening, followed by atrophic changes, converting the skin into a thin, pale, wrinkled tissue. The process may extend upwards to the forearms, upper arms, and face: histologically there was an inflammatory stage and a subsequent atrophy. The connective-tissue was œdematous; the elastic tissue diminished; there was much perivascular infiltration. In some of the recorded cases of this affection there was a synchronous scleroderma: these authors report two cases, one corresponding closely with Herxheimer's description, and another certainly sclerodermic, but closely simulating the first. The question arises whether Herxheimer's form is not in fact also an anomalous sclerodermic condition.

Scleroderma and Goitre.—Klippel[3] makes a careful report of a case of scleroderma associated with goitre. The patient was a woman, aged forty-eight at the time of onset of sclerodermic symptoms, which began with the fingers, and spread to the forearms, face, and chest, and were accompanied by circulatory and sensory troubles; there was at the same time an enlargement of the thyroid. The latter fact has an added interest in view of the attempt to explain scleroderma as due to a lack of pituitary secretion (Strumpell and Roux), or of

suprarenal secretion (many authors). Cases of scleroderma have also been associated with adiposis dolorosa, with splenic hypertrophy, with paralysis agitans, the latter disease being often conjoined with hypertrophy of the parathyroids. Scleroderma has been noted not infrequently in Graves' disease, where excess of thyroid absorption may be inferred, but it is rare in simple goitre as here recorded. **Opotherapy** should be given a trial in scleroderma, especially in the earlier stages, a view which Roques[4] endorses, with a detailed analysis of the literature.

REFERENCES.—[1]*Jour. Cutan. Dis.* Dec. 1909; [2]*Ibid.*; [3]*Sem. Méd.* May 4, 1910; [4]*Ann. de Derm. et de Syph.* July, 1910.

SCLEROSIS (DISSEMINATED).

(*Vol.* 1910, *p.* 68)—**Tiodine**, in daily or twice-daily intramuscular injections of ·2 cgram each, is said to produce marked improvement after a course of some months.

SEA-SICKNESS. (*See also* VOMITING.) *Purves Stewart, M.D., F.R.C.P.*

For the treatment of this condition, it must be confessed, no drug is a panacea. In view of the fact that the sickness is probably largely cerebral in origin, it is to be expected that cerebral sedatives will be the most likely remedies to be of real service. Each year some drug, generally a hypnotic, is extolled in this connection. Thus, for example, Schepelmann[1] recommended **Veronal**, and Pauly[2], the ship's doctor of a transatlantic liner, who has studied Schepelmann's work, finds that **Veronal-natrium** is still better. Veronal-natrium is soluble in 5 parts of water, contrasting with veronal, whose solubility is very slight (1–150). Pauly made observations on over fifty cases treated by himself, from which he concludes that veronal-natrium is of the highest value, both in the prophylaxis and in the treatment of sea-sickness. He quotes the case of a lady, aged forty-two, who had crossed the ocean seven times, and on every occasion had been severely sea-sick throughout the vogage. On the last occasion, however, when the ship started, she was given 0·5 gram (7½ gr.) of veronal-natrium, followed four hours later by 0·25 gram, the latter dose being repeated twice on the succeeding day. As a result, she was entirely free from sea-sickness throughout the voyage, and was able to take the ordinary meals, which had never before been possible.

In cases of threatened *mal-de-mer*, 4 to 7½ gr. promptly arrested the symptoms. In other cases, where the sea-sickness was already in full "eruption," he prescribed three or four successive doses of 0·25 gram (4 gr.). In exceptional cases, as many as six doses were required before relief was obtained. No evil after-effects were noticed, although some patients had a feeling of lassitude the next day. It was unusual for the drug to be vomited. The drug was given in tablet form, preferably crushed, with about an ounce of water.

REFERENCES.—[1]*Ther. Monats.* Aug. 1907; [2]*Berl. klin. Woch.* Mar. 14, 1910.

SEBORRHŒA. *E. Graham Little, M.D., F.R.C.P.*

Cooke and Dodd[1] experimented in a series of eight cases of seborrhœa of the scalp (distinguished from pityriasis by Sabouraud's criteria of diagnosis) with **Vaccines** of acne bacilli, prepared both autogenously

and from stock cultures. Their general conclusion (which is somewhat vitiated by the fact that this was not the only treatment used) is that the vaccines of acne bacilli are incapable of producing any effect on the seborrhœa. Doses of from 4 to 100 millions were used at intervals of about a week.

Reference.—[1]*Pract.* Ap. 1910.

SENILITY IN RELATION TO MENTAL DISEASE. *Bedford Pierce, M.D.* *Norah Kemp, M.B., C.M.*

This is the subject of a paper by Arthur S. Hamilton. He reviews the literature concerning the senile spinal cord, which he finds clinically and anatomically uncertain. During the summer of 1909 he examined the cords of seventy-two individuals, all of whom died when over seventy years of age. He rejected all cases of gross cerebral disease, which left him with fifty-four cases in whom the changes might rightly be ascribed to old age. The mental condition of these cases had been that of senile or organic dementia, while the bodily condition had been such as is common in old people. Post mortem, gross changes in the cord were absent, but in all there was some microscopic abnormality. Alterations in the fibre tracts were constant, vascular changes were found, also abnormal quantities of pigment both inside and outside the cells. Atrophy of the cells was present, with increase of neuroglia and corpora amylacea. Marchi preparations showed the presence of black granules, which if localized, were found chiefly in the posterior and lateral columns. In those parts where a long-standing sclerosis was found, this pigment would in great measure be absent, to be increased in quantity in the neighbouring portions of the posterior columns. Sometimes the appearance presented by the spinal cord degeneration would resemble that found in cases of pernicious anæmia. The pigment was also found in the posterior nerve roots, and constantly in the ganglion cells and cells of the neuroglia. In sections stained by the Weigert method, the most frequent sclerosis was in the posterior columns, and posterior nerve-root degeneration was common. Increase of the neuroglia cells and fibres was invariably present, in some instances the cerebral canal was closed, and instances of hydromyelia were found. Corpora amylacea were found more abundantly external to the dorsal horns and in the neighbourhood of the substantia gelatinosa, and in the posterior columns and periphery of the cord. In the ganglion cells of the cord stained by the Nissl method there was marked pigmentation, appearance of Nissl bodies, with atrophy of the cells, which in some cases completely disappeared.

Reference.—[1]*Bost. Med. and Surg. Jour.* Aug. 4, 1910.

SHOCK.

Pituitary Ext. in (*page* 46).

SIGMOIDITIS. *Robt. Hutchison, M.D.*

Rowlands[1] has published two cases of this rare condition. It may simulate carcinoma very closely, and the true nature of the disease may only be recognized after microscopic examination of the tumour.

Many cases of prolonged survival after colostomy for supposed cancer of the sigmoid have really been cases of sigmoiditis.

Pathology.—The presence of acquired diverticula in or near the sigmoid colon, as pointed out by Telling, is one of the chief causes of simple inflammation of the sigmoid. It is very easy to overlook these diverticula, especially when they are limited to the mesenteric border. They project into a greatly thickened mesentery, and their orifices are often so small that they can only be discovered by means of a probe. They are so hidden as to be very easily overlooked. They are especially common at the mesenteric border following the blood-vessels, where the muscular wall of the bowel is often deficient and ill-supported. The retention of irritating and infective material in the diverticula may lead to inflammation and even to perforation of the thin-walled sacs. This may be followed by spreading or localized peritonitis; but when the diverticula are deeply embedded in a thick mesentery, the inflammation may be confined to the mesentery and the outer walls of the bowel. In some cases suppuration may take place between the layers of the mesentery, and pus may discharge into the bowel or into a diverticulum. In some it may burst into the peritoneal cavity. In many cases appendicitis may be closely simulated, except that the swelling is on the wrong side. Sometimes the inflammation is more chronic, and leads to much thickening and shortening of the mesentery, and interstitial inflammation of the intestinal wall, with secondary stenosis. The mucous membrane may remain fairly healthy for a long time. The formation of diverticula in the colon seems to be chiefly due to long-continued constipation, associated with failure of the muscularity of the intestinal wall. It is therefore a condition which is not often seen before middle age, and Telling points out that " the average age of those in which the diverticula caused clinical symptoms was fifty-five years " (forty-seven cases). It is, of course, admitted that the presence of diverticula is not the only cause of inflammatory stenosis of the large intestine. Tuberculous infiltration, especially of the cæcum and ascending colon, may closely simulate malignant disease. Gonorrhœal, syphilitic, and tuberculous tubular stenosis of the rectum are well-known conditions. The spread of inflammation from the female pelvic organs may give rise to true stenosis of the sigmoid or pelvic colon.

Diagnosis.—The following points may suggest the innocent nature of the obstruction: (1) The long duration of symptoms, and especially the history of life-long constipation; (2) The continued absence of blood from the motions, but the frequent presence of pus; (3) Pain and tenesmus tend to be more severe than in malignant disease.

Treatment is operative, the choice being **Resection. Colostomy** may be required as a preliminary measure, and affords much relief without risk to life. Ileo-sigmoidostomy is rarely practicable.

Reference.—[1]*Lancet*, Ap. 30, 1910.

SILVER FOIL IN SURGERY. *Priestley Leech, M.D., F.R.C.S.*

Lewis[1] recommends the use of silver foil in the following conditions: (1) On clean skin grafts, instead of wet dressings and gutta-percha. (2) In plastic surgery where cosmetic results are desirable, as it minimizes scab formation. (3) It protects wounds against the possibility of infection from without, as in wounds in the groin. (4) To prevent subdural adhesions. (5) In rapidly granulating open wounds, the foil protects the delicate advancing margin of epithelium.

REFERENCE.—[1]*Ann. Surg.* Oct. 1909.

SINUS, PERSISTENT. *Priestley Leech, M.D., F.R.C.S.*

Sag[1] records two cases of persistent sinus which were not relieved after two operations for mastoid disease. He says that if only some cubic centimetres of **Bismuth Paste** are used the treatment is harmless to the patient (*Medical Annual*, 1910, p. 668); and if the results are not always equal to those claimed by Beck, the method is certainly worthy of a trial. His two cases were cured, though they had resisted other treatment; in one the dura mater was exposed.

Elbe,[2] of Rostock, has made a trial of this method in some twenty cases. His conclusions are, that as a means of discovering the course and extent of sinuses and the presence of pus cavities with the help of the *x*-rays, it is of great assistance. As regards the therapeutic effects, he saw no surprising cures, and was not certain how far the healing in some of the cases was entirely due to the bismuth injections.

Shober,[3] of Philadelphia, has tried it in several cases, and thinks it is a valuable addition to the surgeon's armamentarium.

The best summary on this subject is that of Baer,[4] of the Johns Hopkins University. He not only reports the results in a series of his own cases, but he gives those which have been obtained by other surgeons. The opinions as to the curative effect have varied widely; some authors look upon it as giving results very little better than those obtained by other methods; while others, on the contrary, regard it as an excellent method of treatment. Baer adopted it in twelve cases, of which four were cured, a percentage of 33⅓. In a collection of cases made, the percentage of cures varied from 12 to 76 per cent; the greater majority, however, giving from 40 to 55 per cent of cases, a percentage above that obtained by other methods. This naturally suggests either some difference in the agent employed, or in the method. The theories enunciated by Beck as to its action are: (1) That the bismuth subnitrate exerts a destructive influence on the germs of the disease; and (2) That the paste acts as a trestle-work by means of which healthy granulations are formed in the sinus tract. Another theory is that when the patient is exposed to the *x*-rays immediately after the injection, the bismuth becomes radio-active, and thus produces healthy granulations. This can hardly be true, as cases heal up which have not been exposed to the *x*-rays.

Don,[5] of Edinburgh has made a suggestion, which has been independently advanced by Dunning, of Baltimore, that the subnitrate of bismuth, when acted on by the organic acids, gives up its nitric acid, which attacks the tuberculous wall of the cavity and forms a barrier to absorption and to further growth of the tubercle bacilli. It seems possible that the subnitrate is hydrolyzed by the body heat and nitric acid is given off, and that this is the curative agent. Baer says it is impossible that the subnitrate should be broken down by the organic acids. Dunning has made experiments, and has found that no two preparations of subnitrate of bismuth give off the same amount of nitric acid when hydrolyzed at the temperature of the body. In fact, some of the preparations hydrolyze from five to ten times as rapidly as others. That this may explain the varying results obtained by surgeons, is borne out by Baer's experience, for all his cured cases were at one hospital, where it was found the bismuth subnitrate gave off the most nitric acid; at the other hospital he obtained no case of closure of the sinus.

The number of injections needed for a cure varies; rarely does one suffice. It is not free from danger, as poisoning by bismuth may occur; the paste may dam back the discharge, and lead to a toxæmia; and if the paste enters a vein it may lead to fatal embolism. As a therapeutic agent it may be said that it greatly increases the percentage of cures. As a means of accurate diagnosis of the direction and tortuosity of sinuses it marks a great advance. The two illustrations (*Plates XXXVII* and *XXXVIII*) from Baer's paper give a startling proof of this. Both are cases of tuberculosis of the hip, with sinuses appearing along the side of the rectum; the injection of paste shows that the tract in both cases goes up into the pelvis; in one it is seen to go through the acetabulum, and then out into the head of the femur; in the other there is no sinus tract to the femoral head, but the necrotic area lies on the anterior aspect of the sacrum.

Other authors state that equally good results may be obtained by omitting the bismuth. Wilson,[6] of Philadelphia, says that Beck's No. 2 paste without the bismuth has given as good results; and he quotes Ridlon and Blanchard[7] as having used the following paste: white wax, 1 part; vaseline, 8 parts; mix while boiling; add, for use in badly infected cases, $\frac{1}{10}$ to $\frac{1}{2}$ of 1 per cent of powdered iodine at the moment of injection. Iodine scales may be reduced to a powder in a mortar by the addition of 20 per cent of potassium iodide. They have obtained equally good *x*-rays by avoiding the bismuth, and using in its place subcarbonate of iron 1 part, and white vaseline 2 parts.

References.—[1]*Pester Med. Chir. Presse*, No. 12, 1909; quoted in Epit. *Brit. Med. Jour.* Dec. 4, 1909; [2]*Deut. med. Woch.* Mar. 31, 1910; [3]*Ann. Surg.* May, 1910; [4]*Johns Hop. Hosp. Bull.* Oct., 1909; [5]*Edin. Med. Jour.* Feb. 1909; [6]*Ther. Gaz.* June 15, 1910; [7]*Amer. Jour. Orth. Surg.* Aug. 1909, pp. 35 and 142.

PLATE XXXVII.

PERSISTENT SINUS TREATED WITH BISMUTH PASTE.

Tuberculosis of right hip at age of eleven years. The radiograph, taken after the bismuth injection, shows the sinus leading directly to the diseased area in the sacrum, an area which was not even suspected clinically.

PLATE XXXVIII.

PERSISTENT SINUS TREATED WITH BISMUTH PASTE.

Case of tuberculosis of the left hip, of three-and-a-half years' duration. Discharging sinus just to the left of the sacrum. Skiagram, taken immediately after injection of ʒ oz. of bismuth paste, shows the sinus extending up through the pelvis, across it, and then going through the acetabulum of the femur.

SKIN DISEASES, GENERAL THERAPEUTICS OF. (*See also Special Articles.*) *E. Graham Little, M.D., F.R.C.P.*

Alcohol.—Bulkley contributes an admirable essay on the effect of alcohol, physiologically and pathologically, on dermatoses. It may be taken as established that alcohol increases the dilatation of cutaneous capillaries, and thereby increases congestion, decreases the immunity of the blood to infectious diseases, debilitates muscular tissue, and so may influence the tone and glandular secretions of the skin. Since oxidation is the central fact in the dynamics of nutrition, and alcohol inhibits oxidation, alcohol decreases metabolism, and produces retention of products of catabolism and deposit of fat. Of special diseases cited by Bulkley as particularly susceptible to the influence of alcohol, syphilis, rosacea, acne, eczema, psoriasis, erythema, angioneurotic œdema are enumerated in detail, and prohibition of alcohol in these advised. While alcohol used internally is very often pernicious, locally it is useful in many dermatological emergencies. For arresting the burning of free carbolic acid ; as an ingredient in evaporating and cooling lotions ; as a bactericidal agent ; and as an antiphlogistic, it is most valuable.

Carbon-dioxide Snow.—Much literature has been contributed to this subject during the past twelvemonth, and the following article is a digest of the memoirs of Pusey,[2] Morton,[3] Stelwagon,[4] Gottheil,[5] Sutton,[6] and Zweig,[7] supplemented by my personal experience of the method. In Pusey's article, which is much the fullest and most practical, the simple technique is described at length, and its application recommended in **Eczema, Lichen Planus, Lupus Erythematosus, Chloasma** and **Lentigo, Tattoo Marks** and **Powder Stains, Warts** and **Callosities, Nævi,** senile and *x*-ray **Keratoses;** in lupus vulgaris and epithelioma Pusey thinks the method is not one of election. The action of CO_2 snow has been explained as that of a caustic, but this explanation is probably incorrect, since the destruction of tissue is evidently selective, not "*en masse*," as in the case of an escharotic. Microscopical examination of tissues treated by CO_2 snow show an intense leucocytic flooding of the treated area, evidencing a sharply-defined acute inflammatory reaction, and increased phagocytosis. Three principal factors regulate the effect obtained, viz., the duration of the treatment, the pressure exerted, and, to a less extent, the age and sex of the patient : in young people and in women the skin is rather more sensitive. The pressure and the duration of the treatment will vary with the extent and depth of the lesion and the character of the surface ; no hard-and-fast rules can be given. Pusey remarks that skin previously treated by *x*-rays or by radium is especially sensitive, and takes advantage of this quality to shorten the exposure by a previous application of *x*-rays in certain cases. The diseases in which most experience has accumulated are lupus erythematosus and nævi, in both of which the results are probably better than with any other method of treatment. The time of application in lupus erythematosis may be from five to thirty seconds. Pusey prefers the

shorter exposures in vascular nævi, which will usually be seen in infants ; the times are much less, an average of five to ten seconds being usually sufficient.

From my personal experience of the method in **Lupus Vulgaris** and in **Rodent Ulcers** I would confirm Morton, who has had some encouraging results in both these diseases. In the hypertrophic scarring which makes so unsightly an addition to the deformity of lupus vulgaris I have found it particularly useful.

For after-treatment, little is required beyond ordinary antiseptic dressings ; some relief from the smarting which follows thawing may be obtained by using warm-water compresses, but this is seldom necessary. (For method of preparing the snow, see under EYE, GENERAL THERAPEUTICS, OF.)

Colon Lavation.—Mantle[8] considers that **Eczema** is largely caused by disorders of the colon, and has had repeated success in dispelling an eruption by lavation of the colon ; in psoriasis, acne, urticaria, and pruritus the same treatment has been very efficacious. A long rubber tube, sterilized by boiling, is passed into the sigmoid, and is attached at the other end to a douche, by which means 20 to 40 oz. of sulphur-water are injected at a temperature of 105° F. and a pressure of 2 feet, the patient lying first on the right side, then on the back, and then on the left side during the operation ; the ejecta are to be carefully examined. A warm immersion bath of sulphur-water follows the douche, its object being to encourage peripheral circulation and so relieve visceral congestion.

Varnishes in Skin Therapeutics.—Klotz[9] has some useful recipes for cutaneous medication, making use of certain solvents which, evaporating, leave the drug finely divided on the surface. *Collodion* will dissolve or carry numerous drugs : chrysarobin in collodion has long been used for **Psoriasis** and **Tinea Circinata** ; iodoform in collodion has been found useful in removing moderate **Keloids** after burns. *Ether*, either alone or with alcohol, will take up a large quantity of salicylic acid, and may be used in the treatment of **Warts.** In sycosis and parasitic disease of the nails a mixture of 2 parts ether and 1 part oil of wintergreen makes a very penetrating solution. Alcohol, alone or with a slight resinous addition, as, e.g., in tinctura benzoini simplex, makes a useful vehicle for mercuric bichloride (1 per cent solution), and is applied successfully to remove superficial pigmentations, e.g. **Freckles.** Anthrasol dissolved in alcohol makes a cleanly and efficient tarry lotion. *Tumenol* is closely allied to tar, and is soluble in alcohol ; a 20 per cent tincture made with equal parts of alcohol, ether, and water, is an excellent protection for parts which are apt to become saturated with urine or sweat. Pure *ichthyol*, mixed with equal parts of water, makes an easily-applied lotion which dries rapidly. It contracts superficial vessels, and favours cornification of the epidermis ; " the more intense the inflammation the stronger should be the ichthyol solution " ; its use is recommended in *erysipe as*, in the severe dermatitis resulting from rhus toxicodendron, in burns of the first and second

degree, in frost-bite, and in erythemata generally, including the drug eruptions: in such skin diseases as urticaria, insect-bite, herpes zoster lesions, and intertrigo, ichthyol will check the itching. Combined with chrysarobin it lessens the dermatitis which so often follows the use of that drug. Eugallol, the mono-acetate of pyrogallol, is supplied diluted with 33⅓ per cent acetone; it can be rubbed into the skin in this form, and is very efficacious in psoriasis.

Tuberculin Injections in the Treatment of Certain Tuberculides.—The re-introduction into dermatological therapeutics of tuberculin injections, though in far smaller doses than were advocated in the first "boom" of the method, is the subject of a paper by Clark,[10] who has tried it in erythema induratum, acne varioliformis, lupus erythematosus, lupus vulgaris, and scrofulodermia. His conclusions are that only small doses must be used (beginning at about ·0001 mgram bi-weekly, increased in series of tenths, the largest dose given by this writer being 1 decigram); that for **Scrofulides** generally it is useful, but not in lupus erythematosus; that in lupus vulgaris these small doses are seldom useful, and the large doses are dangerous.

Western[11] describes the results in five cases of tubercular disease of injections of tuberculin in doses of ·001 to ·005 mgram about once a week. The treatment answered excellently in scrofulodermic forms, and in one case in lupus vulgaris.

Mercury Succinimide Injections.—Hertzberg[12] tried succinimide of mercury injections, recommended by Lisle Wright, in three cases of **Chronic Tuberculous Ulceration,** in which many other means had been tried without success, and in which the diagnosis of tuberculosis had been made by more than one observer. He regarded the method as of value. About ¼ gr. was given every second day, iodides being administered synchronously.

Rice Diet in Skin Diseases.—Bulkeley[13] advocates the restriction of the diet to rice, bread and butter, and water, in cases of acute irritative diseases of the skin, notably in acute lichen planus, dermatitis herpetiformis, urticaria, generalized eczema, and psoriasis. The patient is kept on this diet from three to five days. On resuming the mixed diet, after the fifth day, a light lunch with morning and evening meals of rice may be given, complete return to ordinary diet being gradual.

Sea-water Plasma.—For the employment of, see *page* 51.

References.—[1]*Med. Rec.* Feb. 19, 1910; [2]*Jour. Cutan. Dis.* July, 1910, p. 353; [3]*Brit. Med. Jour.* Sept. 24, 1910, p. 861; [4]*Ther. Gaz.* Aug. 15, 1910; [5]*N.Y. Med. Jour.* July 3, 1909; [6]*Dub. Med. Jour.* July, 1909; [7]*Münch. med. Woch.* Aug. 10, 1909; [8]*Lancet* July 30, 1910; [9]*Ther. Gaz.* Feb. 15, 1910; [10]*Jour. Cutan. Dis.* Dec. 1909; [11]*Roy. Soc. Med. Trans.* Nov. 1909; [12]*N.Y. Med. Jour.* Nov. 20, 1909; [13]*Brit. Med. Jour.* Sept. 24, 1910.]

SKIN, DISINFECTION OF. *Priestley Leech, M.D., F.R.C.S.*

Several papers on disinfection of the skin by means of **Iodine** have appeared in surgical literature during the year. Stretton,[1] of Kidderminster, has had a further experience of this method in 291 cases. He has only had three failures among clean cases; one of these died of

tetanus. It has also given satisfactory results in casualty work. He tried the treatment in vaccination ; but even if the iodine was allowed to dry on, the vaccine did not take. He does not shave his patients, and has seen no case of dermatitis. The only disadvantage is lacrymation, to which some persons are more susceptible than others. He uses the tincture, and finds that if rectified spirit is used instead of methylated, the lacrymation is less.

Waterhouse and Fenwick[2] at first tried 8 and 6 per cent of iodine in rectified spirit, but this was found to be too strong, and they then used 2 per cent, the first application being made two hours before the operation, and the second on the operating-table. In operations in small boys for the radical cure of hernia, he paints the penis, scrotum, and wound, and leaves them uncovered. In cases where it is possible that the skin incision might be infected by a discharge from a hollow viscus (e.g., cholecystotomy), the line of incision has been painted with 2 per cent iodine solution at each dressing.

Wallace[3] draws attention to the use of iodine dissolved in acetone ; but as this proved to be very irritating, he looked round for another solvent, and tried dichloride of ethylene ($C_2H_2Cl_2$). This is a clear mobile liquid, sp. gr. 1·25, boiling point 55° C., and is non-explosive. He uses a 2·48 per cent solution of iodine, and says that it gives off no irritating vapours. He says[4] the results as to disinfection have been excellent.

The reports on this method have been equally good abroad. Streitberger[5] speaks very highly of it, and thinks that it would be an excellent method for use in warfare. In out-patient practice he has had 1000 cases, in which the results have been much better than by the older methods.

Nast-Kolb[6] recommends the iodine tincture method in fresh wounds and in out-patient practice, but for other cases he prefers the alcohol disinfection method.

Some surgeons have used the iodine after dry-shaving the skin, while others have washed with hot soap-and-water and shaved the night before, using the iodine next morning, or some ten or twelve hours after the bath.

Zatti[7] recommends **Paraffin and Petrol** as efficient means of disinfecting the skin. He has used it in 700 operations during the last three years, and is very well satisfied with it. The method is as follows : If shaving is necessary, it is done the night before. Just before the operation, the region to be operated on is rubbed with a tuft of cotton-wool dipped in paraffin, and then with another dipped in petrol. This method might be useful in emergencies, or in the country ; but from a considerable personal experience the reviewer can recommend the use of iodine, though in susceptible people even the solution in dichloride of ethylene may make the eyes smart and water. The method saves time, saves the worry to the patient of scrubbing and rubbing the night before, and

the results are quite as good as, if not better than, those given by any other method.

References.—[1]*Brit. Med. Jour.* June 4, 1910; [2]*Lancet*, Ap. 16, 1910; [3]*Pract.* Ap. 1910; [4]*Brit. Med. Jour.* May 28, 1910; [5]*Deut. med. Woch.* July 21, 1910; [6]*Münch. med. Woch.* Feb. 8, 1910; [7]*Gaz. deg. Osped.* Ap. 19, 1910.

SLEEPING SICKNESS. (*See* Trypanosomiasis.)

Arylarsonates in (*page* 12).

SLEEPLESSNESS.

(*Vol.* 1910, *pp.* 15, 46)—**Bromural** appears to be a harmless and reliable hypnotic, especially for the nervous forms of insomnia. For children 2½ to 5 gr. may be safely given. **Neuriprin**, an extract of nervous tissue, also has its advocates for use in functional cases.

SMALL-POX. *E. W. Goodall, M.D.*

In some "Practical remarks on the treatment of small pox in **Red Light** and in the dark," C. H. Würtzen,[1] of Copenhagen, draws attention to the necessity of excluding completely the chemical rays of daylight. For this purpose red panes of glass can be used. But red glass may not be efficacious. "Red glass in strong sunshine does not always exclude the green rays, and only glass which on spectroscopic examination has been proved to be faultless in every way should be employed. . . . Spectroscopic examination is absolutely necessary. It must also be noted that red glass which at one time was correct, fades when kept, even if it has been used only for a comparatively short time and has been kept in a rather dark storeroom." The red glass must, therefore, be examined at intervals, to see whether it is impervious to the chemical rays.

Of course, cases of small-pox can be treated in the dark; but this is a very awkward method. If, in a room lighted by red-light or in a dark room, light is required on the rounds of the doctor or nurse, a stearin candle should be used, because the flame contains so few chemical rays that no harm can be done provided it is used only for a short time. Red light affects different individuals (patients and nurses) in different ways. Some do not mind it and remain unaffected; others seem to be depressed, and suffer from headache and a sense of fatigue. Nurses going from a room lighted with red light to ordinary daylight must wear green or blue glasses, on account of the hypersensitiveness of the retina to daylight produced by the red glass.

Reference.—[1]*Brit. Med. Jour.* Aug. 6, 1910.

SORE NIPPLES.

Sod. Salicylate, 4 per cent. sol. locally (*page* 49).

SPIROCHÆTOSIS. *J. W. W. Stephens, M.D.*

W. B. Leishman[1] describes his experiments on the mode of hereditary transmission by ticks of *Sp. duttoni*, and also the method by which ticks infect during feeding. The author has examined ticks proved to be infective, but found no spirochætes in their tissues. Neither did he find spirochætes in the tissues of the eggs or nymphs bred from these

ticks (*O. moubata*), though these latter were also infective (hereditary transmission). Then, again, in examining the fate of spirochætes ingested by ticks, none could be found later than the tenth day, but the chromatin core of the spirochætes broke up into numerous coccoid or bacillary granules, and in some cases these have been found free in the gut in great numbers. Moreover, similar chromatin granules are found in infected ticks in all stages, from the microscopic egg up to the nymph. These clumps of granules occur in the Malpighian tubes, in the ovary, and in small numbers in the walls of the intestine, but very rarely in the salivary gland. Inoculation of emulsions of these granules into mice proved infective, especially if the ticks from which the granules were derived had been kept at a temperature of 34° to 37° C. for a day or two before dissection. This maintenance at an elevated temperature may be a matter of importance, for it is stated that ticks showing these granules in the tissues, when kept for a week or ten days at 34°, show peculiar young spirochætes in their tissues, intracellular probably, but at any rate shorter and less regularly curved than the normal *Sp. duttoni*. At the same time the granules increase in size. These "young spirochætes" may be the direct infecting agent in infected ticks, and not the ordinary blood forms supposed to exist in the salivary glands, or whether it is the granules themselves that infect is not yet certain. The author considers it probable, however, that when a tick infects, it does so by means of its Malpighian secretion, or that of the coxal glands, which are passed at the time of feeding and bathe the wound that the tick makes. Finally, the author has observed these granules on two occasions *in* spermatozoa in the oviduct of an infected female, and suggests that this may explain hereditary transmission through the ovum.

T. W. Twells[2] has treated four cases of Indian relapsing fever with **Orsudan,** 10 gr. intramuscularly, with good result.

References.—[1]*Lancet*, Jan. 1, 1910; [2]*Ind. Med. Gaz.* Mar. 1910.

SPLEEN, DISEASES OF.

George Lovell Gulland, M.D.
Alexander Goodall, M.D.

Hess[1] classifies splenic enlargements as follows: (1) Chronic splenic tumour with leucopenia: primary neoplasm, Banti's disease, acquired syphilis, chlorosis, pernicious anæmia. (2) Chronic splenic tumour without leucopenia: tuberculosis, primary or general, congenital syphilis, waxy disease, chronic malaria, chronic congestion, cirrhosis, polycythæmia, wandering spleen.

Banti's Disease.—Momm[2] finds that trauma from time to time plays a part in etiology. It is not always possible to recognize the three stages (anæmia, splenic enlargement, ascites) into which the symptoms have been divided, owing to the early onset of ascites in some cases. The clinical diagnosis between Banti's disease and venous thrombosis of splenic veins is not yet established. Removal of the spleen is to be preferred to Talma's operation to relieve the ascites.

Paulicek[3] contributes an important paper, and collects the literature. He refers to the case of a girl in whom the spleen removed by operation presented a microscopic picture exactly like miliary tuberculosis. Bacteriological and biological tests for tubercle were alike negative. The etiological factor in Banti's disease is not known, but an infectious element and probably syphilis and tubercle, play a part. The large epithelioid cells which are found in the spleen, and sometimes give an appearance of malignancy, are also seen in the granulomata. It is not always possible to draw a sharp line between the splenic disease and the commencement of a chronic inflammation of the liver. The illness is first localized in the spleen, and from this site the patient is influenced for ill. Splenectomy is therefore indicated.

REFERENCES.—[1]*Wien. klin. Woch.* Feb. 17, 1910; [2]*Deut. med. Woch.* Ap. 28, 1910; [3]*Folia Hæmatologica*, ix. 1 teil, 1910, p. 475.

SPLEEN, SURGERY OF. *John B. Deaver, M.D., LL.D.* } *Philadelphia.*
D. B. Pfeiffer, A.B., M.D. }

Belloni and Moschini[1] report two cases of primary abscess of the spleen. In the first case the abscess was found post mortem after an obscure febrile illness which was thought to be malaria. In the second case the only previous illness of note was gonorrhœa one year before. Symptoms noted were moderate fever, progressive anæmia, and pain beneath ribs on the left side. The spleen was enlarged, palpable, and tender to pressure. For a time the patient was able to attend to his work, until an exacerbation of pain and fever occurred. The case was correctly diagnosed, and was attacked through resection of the ninth and tenth ribs. The parietal pleura was sutured to the diaphragmatic pleura before incising the spleen. A quantity of thick, non-fœtid pus was evacuated. In spite of the precaution, a large empyema formed on the left side, which was drained through the sixth and seventh ribs. Good recovery ensued.

A case of acute torsion of a wandering malarial spleen is reported by Macdonald and Mackay.[2] The spleen, which weighed 2290 grams, was situated in the right lower abdomen, and, with the symptoms, simulated hydronephrosis or appendiceal abscess. Splenectomy was followed by complete recovery after a stormy convalescence due to double pneumonia and malarial recrudescence.

Splenectomy was performed by Mühsam[3] in a case of subcutaneous rupture caused by an automobile running over a boy ten years of age. Before recovery it became necessary to evacuate also a large infected hæmatoma in the left side beneath the ribs. Mühsam comments on the enormous leucocytosis, which reached as high as 80,000, and points out that it was probably due to the coincident influence of anæmia, infection, and splenectomy.

In splenic surgery the most important fact brought out by the work of the past few years is the curability of primary splenomegaly, splenic anæmia, or the early stages of Banti's disease, as the condition is variously called, by simple splenectomy. As these cases are not

excessively rare, and are essentially chronic and easily diagnosticated before the terminal stages of biliary cirrhosis and gastric hæmorrhage, it is astonishing that there are not more reports of operation. While the cause is unknown, and may or may not be primary in the spleen, it is certain that the diastrous effects of its continuance are dependent chiefly upon the splenic enlargement itself, and the results of removal are more gratifying than is the case in many operations more commonly practised.

W. J. Mayo[4] reports ten cases of splenectomy, with one operative death. "One case was a huge lymphosarcoma; the patient is alive and well now, over three and a half years after operation. The second case was one of tuberculosis of the spleen, with primary recovery; present condition unknown. Four cases were splenic anæmia, and were either cured or greatly improved. Two cases were Banti's disease; one patient recovered and one died. Two cases were splenomegalias, that is, enlarged spleens of unknown origin; both patients recovered. Subsequent to four of the splenectomies for splenic anæmia the patients complained of pain in the long bones at intervals for several months."

Fig. 66.—Lower's forceps for compression of the pedicle of the spleen.

Apart from tumours and the hypertrophies which accompany cirrhosis of the liver and the acute infectious diseases, Mayo groups splenic enlargements in three general classes: "(1) Leukæmia, in which the spleen pulp becomes converted into tissue resembling bone-marrow, and in which the spleen, in connection with all the blood-forming organs, rapidly produces white blood corpuscles of the ancestral type, much as epithelial cells run riot in cancer—a probable reversion to the fœtal form of blood-formation. (2) Splenic anæmia, the type in which the enlargement of the spleen is accompanied by a diminution of, and change in character of, the red blood corpuscles—apparently an excess of the adult function of the spleen, producing an unnecessary destruction of the red corpuscles. (3) Splenomegalia, an enlargement of the spleen of unknown causation, without marked blood-changes or any apparent serious interference with the health other than mechanical. This class is one of convenience only, and is closely related to the splenic anæmias."

Mayo makes his incision through the left semilunar line, and, if necessary, carries the upper end to the ensiform. He speaks approvingly of Meyer's method of mobilization of the chest-wall, but has had no occasion to use it. The most important step is to grasp the vascular pedicle temporarily in rubber-covered elastic clamps. To do this it is usually necessary for the organ to be "turned turtle." The

clamp should be applied as close to the root as possible, to leave ample room for subsequent ligation.

"If partial resection is to be done, temporary compression of the pedicle seems to be harmless unless there are gross vessel-wall changes, and after the application of the clamp the desired amount can be resected and the hæmorrhage controlled by buttonhole catgut suturing with a round needle, in a manner similar to that of resection of the liver. It has been shown experimentally that reduction of the arterial supply by ligation results in atrophy of the spleen, and that as long as the veins are left intact, necrosis does not occur. If the splenic artery divides in the hilum, ligation of branches would appear to be an active competitor of partial splenectomy. We have not found the marked alterations in the walls of the blood-vessels which have been shown to be present often post mortem, and which probably represent a terminal condition."

Upon the basis of experimental work carried out upon dogs, Sheldon[5] advocates a new method of dealing with hæmorrhage from the spleen. He proposes to apply an elastic clamp, well guarded by rubber tubing, to the hilum of the spleen, leaving it in place for four hours. At the end of this time it may be carefully loosened to see whether hæmorrhage will again take place. His experiments and analogies from wounds of other regions indicate that ordinarily no hæmorrhage will occur. The clamps may then be removed. If blood flows from the injury, the clamps should be re-applied for another period of four hours. Necrosis of the spleen does not follow unless the circulation be stopped for more than six successive hours. Sheldon advises against suturing or tamponing the splenic wound if the clamp is applied, since it is better that the splenic vessels should empty themselves in order that extensive thrombosis should not take place, giving rise to necrosis later. No permanent vascular changes were observed as a result of the compression. There has been no opportunity to test the method upon the human subject. Sheldon does not think it wise to attempt the method in cases where injury of the large vessels near the hilum has taken place, since, although the hæmorrhage may be controlled, necrosis of a part of the spleen will ensue because of the poor collateral anastomosis of vessels within the organ.

References.—[1]*Gaz. deg. Osped.* Feb. 1, 1910; [2]*Lancet*, Sept. 25, 1909; [3]*Deut. med. Woch.* Ap. 28, 1910; [4]*Jour. Amer. Med. Assoc.* Jan. 1, 1910; [5]*Amer. Jour. Med. Sci.* Ap. 1910.

SPOROTRICHOSIS IN MAN. *E. Graham Little, M.D., F.R.C.P.*

In a memoir which is a model of careful bacteriological and clinical observation, Hyde and Davis[1] describe a case of sporotrichosis in man, which originated in North Dakota from an epidemic in horses, diagnosed as glanders. The patient was a healthy young farmer, who showed an initial lesion on the back of the left hand, with subsequent developments on the forearm and shoulder; finally, large flat papulo-tubercular lesions, as large as a chestnut and all containing pus, appeared on both sides. There was general glandular enlargement and tenderness.

From the pus obtained from the cutaneous lesion on the hand, numerous cultural tests were made. An organism, a sporothrix, was grown in pure culture. It consisted of an abundant branched mycelium, with oval or pear-shaped spores attached by fine pedicles to the mycelial threads, but easily removed from this attachment, so that the spores are commonly seen discrete. The organism stains readily with most dyes, and is Gram-fast. Dilute carbol-fuchsin is one of the most satisfactory stains. The sporothrix is strictly aerobic, grows well on ordinary media, and especially on media containing sugar; the room-temperature suits as well as that of an incubator; the cultures are odourless. On blood-agar the growth is visible within twenty-four hours, though still scanty; it becomes more profuse with the lapse of a few days. Inoculations into animals readily produced the disease, which was fatal in one mouse and one rat, the subjects of experiment. Inoculations were readily made in a monkey, who survived two inoculations. A sporothrix exactly like the organism of the parent culture could be demonstrated in the pus and in the tissues of the animals inoculated.

REFERENCE.—[1]*Jour. Cutan. Dis.* July, 1910.

SPOTTED FEVER. *J. W. W. Stephens, M.D.*

Spotted fever is a disease of Idaho and Western Montana in the Rocky Mountains. The present state of our knowledge is summarized by H. T. Ricketts.[1] The disease is sharply limited to the spring months, and in this connection the habits of the incriminated ticks are important.

SYMPTOMS.—Continuous moderate high fever, severe muscular and arthritic pains, and a profuse petechial or purpural eruption, first on the ankles, wrist, and forehead, then over all the body. The spleen is much enlarged, and also the lymphatic glands. The death-rate in Montana is exceedingly high, 90 per cent; while in Idaho it is 5 per cent, pointing to some difference in the two diseases.

TRANSMISSION.—The Idaho disease is transmitted by *Dermacentor modestus*; while that in Montana is transmitted by *D. venustus*. Guinea-pigs can be infected by ticks, and also by inoculation of blood. Further, the disease is also hereditarily transmitted by ticks, but only to the extent of about 50 per cent. "Stage-to-stage" infection also takes place, viz., from larva to nymph and nymph to adult. It has further been shown that ticks are naturally infected. The question then arises, from what source are the ticks infected? Certain small animals, such as ground squirrels, rock squirrels, chipmunks, ground-hogs, probably act as a reservoir; the disease is transmitted from animal to animal, and occasionally to man, by ticks, in various ways as seen above. The author favours the view that the disease is a bacillary one, as minute polar-staining bacilli are found in the eggs of infected ticks; but as similar bacilli exist in avirulent ticks the matter is not settled.

REFERENCE.—[1]*Med. Rec.* Nov. 20, 1909.

STERILITY. *Priestley Leech, M.D., F.R.C.S.*

Martin,[1] of Philadelphia, recommends **Epididymo-vasostomy** in cases of sterility. The technique is as follows: A lateral anastomosis may be made between the vas and the epididymis, or the vas may be divided, its end split, and the split end sewn into the epididymis. Before making the anastomosis, the milky fluid escaping from the epididymis is examined for spermatozoa, and if these are not found, section is made near the testicle; in one case followed by success, this section was made in the region of the rete testis. The patulousness of the vas from the level to the middle of the epididymis may be proved by the injection of indulen, or carmine, and if the vas is patulous, the colouring matter appears in subsequent seminal emissions. Azoospermia incident to gonorrhœa or other affections may be due to obstruction in the epididymis, the vas, or the ejaculatory duct; the seat of obstruction is frequently in the ejaculatory ducts, is certainly at times in the vas, and, as shown in one case, may be multiple in the vas. An anastomosis between the vas and epididymis or testicle can be successful only when there is no occlusion between the seat of anastomosis and the urethra. Several cases are reported, successful and unsuccessful.

REFERENCE.—[1]*Ther. Gaz.* Dec. 15, 1909.

STOMACH, CANCER OF THE. *Robt. Hutchison, M.D.*

Some discussion has lately taken place as to the relation of carcinoma of the stomach to chronic gastric ulcer. Wilson and MacCarty[1] have made careful histological investigations of specimens of carcinoma, and found that of 153 undoubted cases no fewer than 71 per cent "presented sufficient gross and microscopic evidence of previous ulcer to warrant placing them in a group labelled 'carcinoma developing on preceding ulcer.'" On the other hand, it has been pointed out by Gordon[2] that this conclusion is opposed to clinical experience, which fails to show anything like such a high percentage of cases of carcinoma which give a history pointing to preceding gastric ulcer. Hauser[3] considers that the question is not yet ripe for settlement, and after reviewing some of the arguments on both sides, concludes that the development of carcinoma upon a basis of chronic or healed ulcer is probably far commoner than has hitherto been supposed.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* Dec. 1909; [2]*Lancet*, Mar. 12, 1910; [3]*Münch. med. Woch.* June 7, 1910.

STOMACH, HYPERÆSTHESIA OF.

Aluminium silicate in (*page* 6).

STOMACH, SURGERY OF.

John B. Deaver, M.D., LL.D.
D. B. Pfeiffer, A.B., M.D. } *Philadelphia.*

Gastric Ulcer.—While the frequency and serious nature of this disease is yearly being more widely recognized, there is as yet no general accord concerning the optimum time for operation, nor as to the mode

of procedure to be adopted by the surgeon. Insufficient advance has been made in the field of diagnosis, and still the physician is surprised, by the onset of frank symptoms of ulceration, into the realization that his patient has long been suffering from this disease. The condition is more frequently diagnosed since it has become apparent that the classical syndrome applies only to a fraction of the more severe cases. Medical statistics of cure have already been discredited by the discovery that the majority of cases suffer recurrence after discharge as cured, while the chronic and resistant nature of the lesion, and its natural tendency toward remissions, explain the discrepancy between immediate and ultimate medical cures.

That medical treatment is not infrequently successful in early and uncomplicated ulcer there is none to deny, and that it should be given a thorough trial before resort to surgery is also granted. Doubtless many early cases are healed without knowledge of the physician that he is dealing with ulceration. This is due to the equivocal signs of lesions of moderate grade. It is equally true, however, that the ulcers which come to clinical notice, having given signs that permit of recognition, fail of cure in more than half the cases when treated by any of the non-operative regimens. The ultimate results of operative methods are becoming known in proportion as the short time that this treatment has been practised gradually lengthens sufficiently to permit of adequate retrospective.

Clairmont,[1] in an analysis of 259 cases, concludes that the mortality of operative treatment of gastric ulcer in the last decade has diminished from 24·5 to 6·6 per cent, and with the employment of posterior gastro-enterostomy from 16·6 to 3·5 per cent. In 52 per cent cure, in 15 per cent improvement, can be expected. Light is thrown upon the expectancy of cure by means of gastro-enterostomy in a compilation of cases which had been under observation of the American Gastro-enterological Society for one or more years after operation, reported by Bettman and White. The results after one year are shown in the table appended :—

	Pyloric Obstruction			Chronic Ulcer	No Lesion
	Ulcer	No Ulcer	Ulcer?		
No. of cases	44	37	6	25	14
Immediate mortality	8	1	..	2	2
Well	25	26	4	17	6
Much better	1	2	1	1	..
Little or no better	7	7	1	5	6
Cancer developed	3	1	..	..	..

It is interesting to note that the final results are approximately the same in cases of ulcer without obstruction and obstruction with or without ulceration, though the cases in the former class are too few to admit of generalization.

As yet few cases come to operation before the advent of serious complications, so that the curative influence upon simple ulcer resulting from the alteration of mechanical and chemical conditions in the stomach produced by gastro-enterostomy must be inferred chiefly from its efficacy in a large percentage of cases where the ulcer is in the the more resistant stages of chronicity or complicating dangers. It seems now a fair conclusion that this operation will cure ulceration of the stomach in approximately 80 per cent of all cases not accompanied by lethal hæmorrhage or perforation. That this showing is sufficient to urge the advisability of early operation is clear, and there can be no doubt that the present tendency of the profession towards delay is largely due to the uncertainties of diagnosis concerning both the actual presence of the ulcer and the degree of advancement. More radical treatment in early ulcer therefore awaits increasing keenness of diagnostic acumen and methods in this disease, or the acceptance by the practitioner of a diagnosis of "surgical upper-abdominal disease" as a sufficient indication for operation. This is not an advocacy of the "exploratory" operation, but a recognition that at the present time several surgical diseases common to the upper abdomen, namely, those of the gall-bladder, pyloric region, and the pancreas, may frequently pass beyond the optimum time for operation before differentiation is possible, though this occurs far less often without plain signs that medical treatment is failing in its object and that surgery is indicated. Such an attitude would possess far wider significance than its relation to gastric ulcer alone. The treatment of cancer of the stomach, of biliary and pancreatic disease, which offer the same difficulty to early diagnosis, would be correspondingly advanced.

Gastro-enterostomy, "the keystone of gastric surgery," still remains unchallenged as the operation of choice in the great majority of cases of gastric ulcer. The anterior anastomosis is advocated by none, except where mechanical conditions do not permit the posterior method. The increased liability to peptic ulcer of the jejunum after anterior gastro-enterostomy is emphasized by Maylard and Andrew's[2] case in which perforation of a jejunal ulcer occurred eight months after anterior gastro-enterostomy had been done for perforated gastric ulcer. This was followed by a third perforation two years later, also in the jejunum, below the site of the former ulcer. W. H. Battle[3] also describes a case of perforation of gastro-jejunal ulcer following anterior gastro-enterostomy. E. Payr,[4] in a plea for individualized treatment of ulcer in various situations and degrees of pathological change, states the well-nigh universal belief that not only gastro-enterostomy, but also excision and resection, have a field which is yet to be deduced by combining clinical and pathological investigations with a knowledge of gastric physiology and the results of operation in these various types of cases.

Hæmorrhages.—Under the heading of hæmatemesis and its treatment, W. J. Taylor[5] reports two cases of gastric ulcer complicated by massive hæmorrhage in which the bleeding was controlled by direct

means. In the first case, after gastrotomy, the vessel was easily seen in the bed of an ulcer towards the œsophageal end of the stomach, and was secured by silk suture. In the second case the ulcer was readily found on the lesser curvature, but the bleeding vessel could not be detected. An attempt was therefore made to occlude the vessels along the lesser curvature by sutures passed through to right and left of the indurated mass. There was one slight hæmorrhage subsequently, but after that recovery was uninterrupted. Gastro-enterostomy was done in both cases.

Perforated Gastric or Duodenal Ulcer.—Gibbon and Stewart[6] give a series of 22 cases of perforated gastric and duodenal ulcers, 15 of which were situated on the anterior wall of the stomach, and 7 on the anterior wall of the first part of the duodenum. Treatment comprised more or less irrigation, drainage, and salt solution per rectum. Stewart used the right lateral posture, while Gibbon employed the Fowler position. The authors take a stand against gastro-enterostomy unless it be necessary because of closure of the pylorus. In the 22 cases there were 10 deaths, all the recoveries being in patients operated on within seventeen hours after perforation.

Morton[7] reports thirteen cases of perforation of gastric and duodenal ulcers, and lays stress on the early symptoms, chief of which is sudden, violent onset of pain, with rigidity and tenderness of the upper abdomen, following usually a history of previous gastric trouble; vomiting, distention, and diminution of liver dullness, were variable factors in his series, as was the appearance of the patient, though as a rule there was something of the anxious look so characteristic of serious abdominal trouble. The ulcer was excised in only one instance, and in two cases primary gastro-enterostomy was performed, in one case because of narrowing of the lumen, in the other because of friability of the tissue surrounding the ulcer, which was found to be malignant. One case in which no gastro-enterostomy was done had a fresh perforation four months after recovery. No irrigation was practised. Drainage was provided by a tube in the pelvis, and in a majority of cases by an additional opening in the flank. Excluding the malignant case, there were seven recoveries and three deaths; mortality, 30 per cent.

Carwardine[8] briefly presents twelve successive cases of perforation of the stomach and duodenum, with eleven recoveries. He attaches great importance to rapid operation, avoidance of irrigation of the peritoneum, with free drainage, early feeding by mouth, and the administration of continuous saline solution per rectum immediately after operation. He advises draining the right and left subphrenic regions in every case. Primary gastro-jejunostomy was done in three cases, all of whom recovered. In one case this operation was required six months later.

Multiple Successive Perforations.—In addition to Maylard and Andrew's case, above cited, Andrew[9] reports one which suffered three successive perforations of the stomach at intervals of three years and six months respectively. Gastro-jejunostomy was not performed

at any of the operations. He includes with this report eleven other instances of perforation of the stomach or duodenum, with seven recoveries and four deaths. The author simply closes the ulcer and flushes the abdominal cavity with warm saline. Drainage is carried from the flanks as well as by suprapubic opening.

Perforated Duodenal Ulcer.—B. Mitchell[10] describes a remarkable series of twenty-eight cases of perforation of duodenal ulcers with only three deaths. He holds that the "mythical shock" of duodenal perforation "must be relegated to its proper place, and diagnosis made without regard to it." "Sudden, intense pain, associated with hardness and rigidity of the abdominal muscles, with characteristic peritoneal stillness, are outstanding features of perforation." He believes that duodenal perforation is less dangerous than gastric, for the reason that the pylorus contracts sharply and firmly with the onset of perforation, thus obviating the escape of stomach contents. This action of the sphincter is an additional reason for the avoidance of opium. His method of treatment consists in rapid closure of the perforation by any adequate method of suture, followed by gentle cleansing of the area of extravasation by gauze sponges. General irrigation was never practised, as the author states it is infinitely "better not to cleanse at all than to cleanse too much." Drainage was provided by a large glass tube inserted into the pelvis. Primary gastro-jejunostomy is advised should the general condition warrant the little additional exposure, and all the seven cases in which it was done recovered. One case required the operation on the eighth day owing to dilatation of the stomach, and one eighteen months later for a similar reason; one in which it was not done perforated the second time within eight months, and two at least suffer from symptoms calling for gastro-jejunostomy.

It is readily seen from the above extracts that the performance of gastro-enterostomy at the primary operation for perforation still remains a question governed not only by the condition of the patient and the local lesion, but also by personal preference of the operator. The evidence contained in the reports of the past year, however, plainly supports the belief in primary gastro-enterostomy, in which the writers share. Not only is the mortality less in cases so treated, but these cases did not suffer later perforation (excepting the case where anterior gastro-enterostomy was performed), as occurred several times where this operation was omitted. Several cases, moreover, required gastro-enterostomy later, or suffered from symptoms calling for its performance.

The absolute indication for gastro-enterostomy furnished by stenosis of the pylorus or duodenum, whether occasioned by old cicatricial contractions or by encroachment upon the lumen necessitated by closure of the perforation, is admitted by all. Nor do those who favour primary gastro-enterostomy advise its performance in those cases where danger is palpably increased by the slight prolongation of anæsthesia required. It is generally felt also that operators of slight experience, to whom

the anastomosis is a tedious and less certain procedure, should content themselves with simple closure of the opening in the bowel.

The question of irrigation is likewise far from settled. Mitchell strongly advises against extensive irrigation. Continental opinion is more favourable to it, and Martens[11] regards it as an essential for the operator second only to suture of the perforation. Salt solution is used by all who practise irrigation, antiseptics having long ago been relegated to deserved oblivion. While the year has not brought the solution of this problem, it is noteworthy that the results of those operators who do not use irrigation are somewhat superior to those of its advocates, which would seem to show that it is not an essential step of the operation, and may well be omitted because of the time it consumes, if for no other reason.

Martens advises that patients with gastric ulcer be apprised of the danger and symptoms of perforation, and cites a case in which the patient, who was so informed, was able to diagnose his own case and reach the operating-table in an hour after perforation.

Carcinoma of the Stomach.—W. J. Mayo[12] reviews 266 partial gastrectomies performed in St. Mary's Hospital, Rochester, Minn., with thirty-four deaths, an average mortality of 12·4 per cent. The total number of excisions for carcinoma of the pylorus was 224. Fifty of these had been operated on over five years ago. It was possible to trace 39, 7 of whom had remained well for from five years to eight years two and a half months. In one case recurrence took place after seven years two months. Of 85 patients operated on over four years ago, 64 were traced, 13 of whom were alive and well. Of 117 who had passed three years after operation, 88 were traced, 18 being alive and well. Mayo believes that gastric cancer rarely gives rise to diagnostic symptoms during the curable stage, and calls attention to two signs of great importance; first, food remnants found repeatedly in the stomach after twelve hours; second, the finding of a movable tumour in the pyloric end of the stomach. He has observed both in cancer and in ulcer that when there was glandular involvement to only a moderate degree, the evident adenopathy was usually confined to the glandular groups which accompany the four arteries, superior pyloric, gastric, gastro-duodenal, and gastro-epiploic. In the later stages, involvement of the glands occurs in the transverse mesocolon, the glands of the common duct, and those along the upper border of the pancreas, and in other situations, indicating only too clearly that to secure the best results the disease must be removed before the lymphatics are infected. *Plates XXXIX and XL* outline the author's technique, which is described in full in the original article.

The two-stage operation for cancer of the pylorus is advocated by E. W. Hey Groves[13] in a report of eight excisions of the pylorus for cancer. Two of the patients died immediately after operation by the Billroth 1 and Billroth 2 methods respectively. Of the remaining six, who were first submitted to gastro-enterostomy before resection, five recovered. He believes that a fortnight represents the average time

PLATE XXXIX.

CANCER OF THE STOMACH. (W J. MAYO'S OPERATION.)

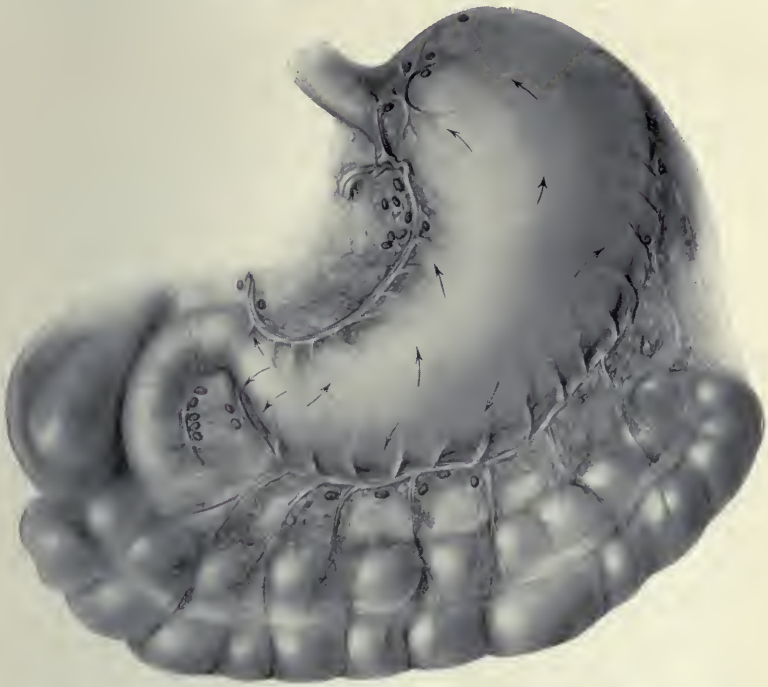

Fig. A.—Anatomy of the stomach with especial reference to the blood-vessels and lymphatics. The arrows indicate the direction of the lymphatic flow.

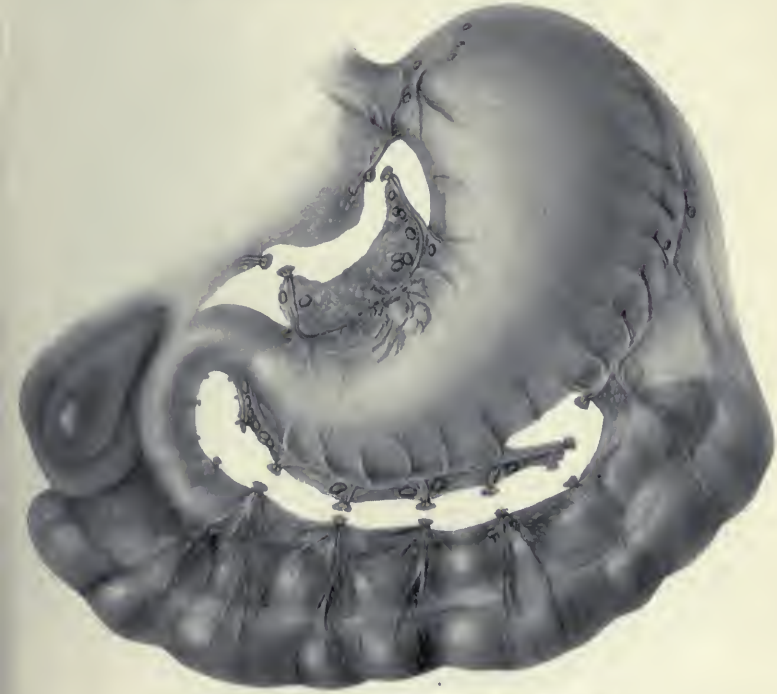

Fig. B.—Vessels ligated and lymphatic dissection completed.

Drawings by Dorothy Peters.

CANCER OF THE STOMACH. (W. J. Mayo's Operation, *continued.*)

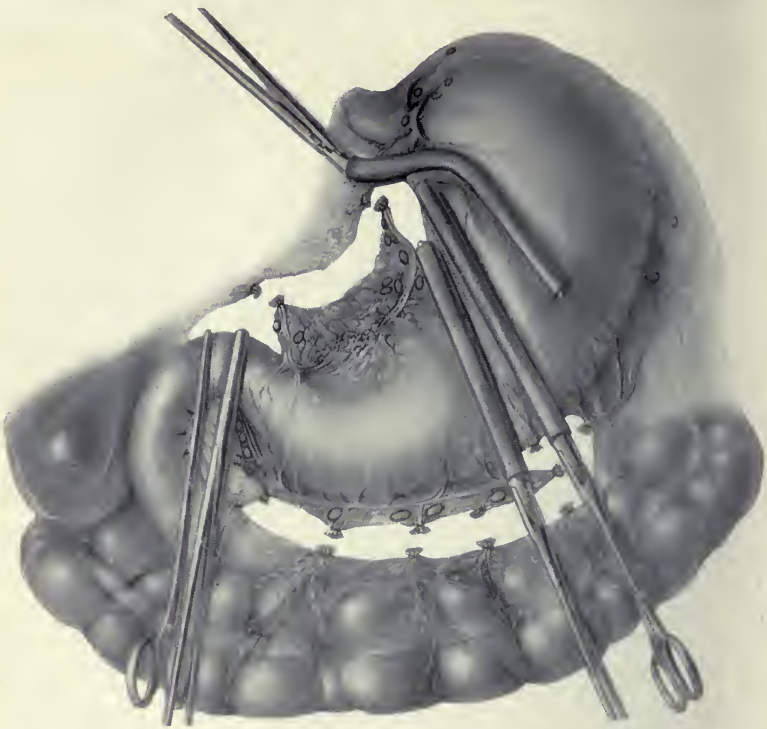

Fig. C.— Clamps placed on the stomach and duodenum, isolating the pyloric end and lesser curvature.

Fig. D.—Restoration of gastro-intestinal continuity by an anterior gastro-enterostomy, which may be used in place of the posterior operation when the remaining stomach pouch is very small.

which should elapse between the two operations. He advocates that the great omentum should be removed because of its lymphatic connections with the stomach, basing his belief upon a case in which he found carcinomatous adhesions between the tip of the omentum and the mesentery of the ileo-cæcal region. No mention is made of the common occurrence of pelvic implantation of carcinoma, which would seem to be the easiest way to explain his observation.

Five cases of jejunostomy for advanced cancer of the wall of the stomach are reported by W. G. Spencer.[14] In only one case was life prolonged to any considerable extent, the patient surviving a little more than a year. Symptoms were ameliorated more or less in all cases.

Gastroptosis.—The surgical treatment of gastroptosis is discussed by Beyea.[15] He criticizes all operations which involve adhesions of the stomach or the omentum to the abdominal wall, on the ground of disturbance of function, production of pain, and liability to cause obstruction. Gastro-enterostomy and pyloroplasty are not considered necessary, and are unduly dangerous and mutilating. His own operation of plication of the gastrohepatic omentum (*Fig.* 67) has been done thirty-four times, to which he has contributed twenty-six cases. In all his cases medical treatment has been given a thorough trial without relief from retention and fermentation of food. There was no immediate mortality. In all but three instances improvement in health had been remarkable, and relief of symptoms complete. These three cases are regarded as essential neurasthenia, while the nervous symptoms in the remaining cases are regarded as induced by the ptosis and consequent digestive disturbances. The patients operated on represent only the class of gastroptosis occurring independently of relaxation of the abdominal walls or diastasis of the recti muscles. If the liver be proptosed, it is sought to correct this by stitching the round and falciform ligaments to the upper end of the incision. In a general visceral ptosis Beyea contends that it is the stomach that causes the greater part of the symptoms. He quotes the studies of Pancoast, Sailer, and Worden, who found that no form of binder, bandage, or corset elevates the stomach to the slightest extent. The binder, however, does give relief by increasing the intra-abdominal pressure.

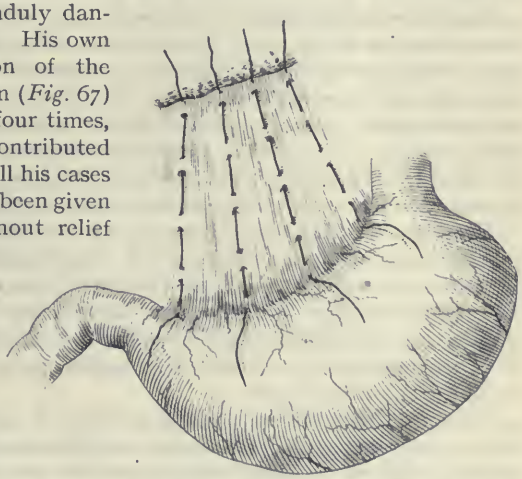

Fig. 67.—Suture of the gastrohepatic omentum to secure elevation of the stomach in gastroptosis.

When the suffering is great and unrelieved by medical means, the operation is warmly commended.

Gastro-enterostomy.—Deaver[16] inveighs against the improper use of gastro-enterostomy. In acute dilatation of the stomach, early and repeated use of the stomach tube renders the operation unnecessary. In the pure neuroses the results of the operation do not warrant the risk. The psychical impression striven for may be more safely obtained by less radical measures. In dilatation without stagnation it promises no improvement, and may make matters worse. In advanced carcinoma of the pylorus, death or aggravation of symptoms is at least as common as palliation, and operation in general is brought into disrepute. It is necessary also to be on guard against operating on patients who are suffering from gastric crises of nervous origin. In cases of the above types the operation is characterized as an abuse.

An interesting subjective account on " Before and after Gastro-enterostomy," is contributed by J. Mackie Whyte, M.D.[17] He suffered from symptoms of increasing pyloric stenosis for a period of nine years, becoming much reduced in health. The various palliatives used before operation are discussed. Rest after meals was of distinct use. Massage seemed to help the emptying of the stomach at times. Antacids were of essential service as palliatives. Syphonage was indispensable. A posterior gastro-enterostomy was finally done. A thickened, hard pylorus, probably due to chronic ulcer, was found. Restoration to health was prompt and complete.

Pyloroplasty.—Kausch[18] claims priority for Mikulicz in the operation of extra-mucous pyloroplasty, which was practised in his clinic in one or two cases of cicatricial contraction of the pylorus without satisfactory results, and was therefore abandoned. Since Weber has employed this method with good results in two cases of congenital stenosis, it is recommended as applicable in pylorospasm and muscular hypertrophy of moderate grade.

Foreign Bodies.—Two successful cases of gastrotomy for foreign bodies are reported by Hastings[19] and Borchardt.[20] In the first case a lead pencil had become impacted in the duodenum. In the second case a large assortment of nails and other foreign bodies was found.

An ingenious method of removal is recorded by Pollard,[21] who extracted a two-shilling piece from the stomach of a girl by passing a long flexible forceps down the œsophagus after locating the coin by laparotomy.

REFERENCES.—[1]*Ther. d. Gegenw.* Sept. 1909; [2]*Lancet*, Feb. 19, 1910; [3]*Brit. Med. Jour.* Ap. 23, 1910; [4]*Wien. klin. Woch.* Mar. 3, 1910; [5]*Berl. Med. Jour.* Nov. 1909; [6]*Jour. Amer. Med. Assoc.* Nov. 6, 1909; [7]*Brit. Med. Jour.* Jan. 29, 1910; [8]*Lancet*, Jan. 22, 1910; [9]*Ibid.* Feb. 19, 1910; [10]*Brit. Med. Jour.* Oct. 2, 1909; [11]*Berl. klin. Woch.* Mar. 7, 1910; [12]*Jour. Amer. Med. Assoc.* May 14, 1910; [13]*Brit. Med. Jour.* Feb. 12, 1910; [14]*Pract.* June, 1910; [15]*Jour. Amer. Med. Assoc.* Mar. 5, 1910; [16]*Amer. Jour. Med. Sci.* May, 1910; [17]*Pract.* June, 1910; [18]*Berl. klin. Woch.* May 23, 1910; [19]*Brit. Med. Jour.* Feb. 12, 1910; [20]*Berl. klin. Woch.* Feb. 21, 1910; [21]*Lancet*, Nov. 13, 1909.

STREPTOCOCCIC DISEASE.
Successfully treated by **Vaccines** (*page* 63).

SUTURE OF ARTERIES. (*See* ARTERIES.)

SYPHILIS. *C. F. Marshall, M.Sc., M.D., F.R.C.S.*

DIAGNOSIS.—J. E. R. McDonagh[1] gives a good account of the modern methods of diagnosis, with special reference to the practical value of the Wassermann reaction, and the method of dark-ground illumination for detection of the *Spirochæta pallida*. He considers Wassermann's original method superior to all the modifications which have been introduced, and remarks that the test can never be simplified to such an extent that it can be used in the consulting-room. The reaction itself is empirical, and probably chemical, so that every care should be taken to avoid any source of error. In primary syphilis a positive diagnosis can be obtained only by finding the *S. pallida*. The secretion from the sore should be examined by dark-ground illumination (see *Medical Annual*, 1910). This can be done while the patient waits. The question of differentiating the *S. pallida* from the *S. refringens* is of little importance, as the latter seldom occurs in the secretion of chancres, and only in the later stages of other venereal diseases. A simpler method, requiring no special apparatus, is by means of Chinese ink (Burri's method). The secretion from the sore is mixed with equal quantities of a solution of Chinese ink and distilled water, spread on a slide, allowed to dry, and examined with oil-immersion. The spirochætes stand out white on a dark background. McDonagh advises excision of a chancre in which the *S. pallida* has been found, whenever the situation of the chancre renders this possible. Cases have been reported in which excision prevented the occurrence of further symptoms of syphilis, and in any case these are said to be milder.

The Wassermann test is of little use in primary syphilis, as it does not give a positive reaction in early chancres, and only in 40 per cent of cases during the whole of the primary stage. In the secondary period the reaction is positive in 85 per cent of all cases with or without an eruption, and with or without treatment; in 97 per cent of cases with an eruption and without treatment; in 80 per cent when symptoms are absent. A negative reaction may be due to (1) Absence of specific antibody in serum, because the virus is dormant, or has disappeared; (2) The influence of mercury; (3) The patient being one of the 3 per cent who in any case give a negative reaction. All positive cases should be treated, also cases which have not received at least two years' treatment, in spite of a negative reaction. After a course of inunction or injections, the reaction usually becomes negative, but after the mercury has been eliminated from the system the reaction may be either positive or negative; the greater the number of courses, the more likely is the reaction to become negative; but it almost always becomes positive again when symptoms recur.

The author considers injections less potent, and oral administration of mercury much less potent, than inunction, which he regards as the most powerful of all forms of treatment. The earlier the disease is diagnosed, and vigorous treatment commenced, the sooner will the reaction become permanently negative. If the reaction is negative three, six, and nine months after the last course of mercury, the case may be considered cured. In the tertiary period 70 per cent give a positive reaction. A positive reaction in the tertiary period with no symptoms suggests the presence of visceral syphilis. A positive reaction indicates mercurial treatment, together with, or followed by, iodides, except in the case of tabes and general paralysis, which are aggravated by mercury.

Wassermann's test is especially useful in the following conditions: (1) Cases with a rash which have been treated by mercury owing to history of a doubtful primary sore. In such cases the blood should be tested a month after cessation of mercurial treatment, iodides being given for the first three weeks to eliminate the mercury; (2) Differential diagnosis between varicose ulcer and gumma; (3) Between gumma, tubercle, and new growth of the testicle; (4) Between gummatous periostitis and sarcoma; (5) Between gumma and malignant growth of the liver; (6) Between syphilis, tubercle, and cancer of the rectum; (7) In deciding for or against marriage in a patient who has had syphilis.

In *congenital syphilis* a positive reaction can be obtained on the day of birth. If an apparently healthy child, one of whose parents has had syphilis, gives a positive Wassermann reaction, it should have antisyphilitic treatment. In congenital syphilis, mercury has little influence in converting a positive into a negative reaction; hence, no rule can be laid down for the duration of treatment, but it is safest to give mercury for two years. In congenital syphilis with no symptoms, the Wassermann test is important, since the reaction has shown the possibility of the next generation inheriting the disease. The test is also of use in life insurance. With regard to the reason why all cases of florid syphilis do not give a positive reaction, the author thinks it probable that, in some cases, when inactivating the patient's serum to rid it of its complement, the first action of the rise of temperature is to cause binding of the complement with the antibody. This would produce a diminution of free antibody, so that all the fresh complement added from the guinea-pig's serum cannot be used up; some would remain free, and combining with the amboceptor of the rabbit's serum, would cause hæmolysis of the sheep's corpuscles. The complement in human serum disappears by the third day, even when kept at a temperature of 0° C. If, therefore, the patient's serum is kept four or five days, and not inactivated in the usual way by heating, many of the cases which give a negative reaction will now give a positive one. The blood to be tested can be obtained by puncturing the pulp of the finger with a sharp instrument, after previously washing the finger in absolute alcohol. In this way 3 cc. of blood can be

obtained, but 1 cc. is sufficient. This method is preferable to bleeding from the arm.

H. Wansey Bayly,[2] in an article on the use of the " ultra-microscope " (dark-ground illumination), in the early diagnosis of syphilis, says that distilled water is the best medium in which to examine the *S. pallida*, as the latter becomes swollen by osmosis, and is thus more easily seen than when examined in normal saline or serum ; but the movements are more active and last longer in the patient's own serum than in distilled water. The movements include lateral bending, undulation, rotation on long axis, and concertina-like movements. As regards differential diagnosis, the *S. refringens* found in the mouth, mucous membranes, superficial sores, etc., the *S. buccalis* found in the mouth, and the *S. balanitidis* found in balanitis, are much larger and more active, and have wider and more open spirals, than the *S. pallida*. The spirochætes which most resemble the latter are : (1) The *S. dentium* found in carious teeth, which has shallower spirals ; (2) The *S. pertenuis* of yaws, in which the ends are often twisted into-loops ; (3) The *S. pseudo-pallida* of ulcerated cancers, in which the spirals are more irregular and shallower. The *S. pallida* should be looked for at the margin of the lesion, not in the centre of an ulcerated area, which contains saprophytic spirochætes. The organism is found most abundantly in mucous patches, and is constantly present in untreated chancres ; it is usually present in papular syphilides, but only occasionally in the lymphatic glands.

Both local and general treatment cause marked diminution in the number of spirochætes ; but they tend to disappear in a few weeks from the site of primary inoculation, even without treatment. If a local antiseptic has been applied, the patient should be told to wash it away with plain water, and return for examination in a few days' time.

P. W. Clough[3] reports his experience with the Wassermann reaction, and considers that none of the simplified methods that have been sufficiently tested have proved as reliable as the original one. He considers the reaction unreliable for prognosis, since mild cases yielding readily to treatment may react as strongly as severe, intractable cases. As regards its diagnostic value, he points out that a negative reaction sometimes occurs in a patient with active secondary or tertiary lesions, and in this respect its limitations are analogous to those of the Widal reaction in typhoid fever. It is best to regard a positive reaction as simply indicating a pre-existing infection ; though usually active, it may be latent and not the cause of the symptoms present. " While it may be going too far to accept a positive reaction as absolute proof of syphilis, if the exceptions noted are kept in mind, it may be considered conclusive for all practical purposes."

Brauer[4] has investigated the problem of the action of mercury on the Wassermann reaction. He considers that mercury acts directly on the virus itself, not on the substance which causes deviation of complement, and that its effect on the reaction is an indirect one.

As long as any of the virus remains to resist the action of mercury, there is always a possibility of fresh formation of the complement-deviating substance ; but when the last of the virus has been destroyed, the reaction becomes permanently negative.

Flashman and Butler[5] have written an instructive paper on " Complement fixation as a method of diagnosis in syphilis and general paralysis." They draw attention to the remarkable fact that general paralysis, which has only recently been definitely attributed to syphilis, gives a greater proportion of positive reactions than any stage of the original infection. They think that this fact is better explained by regarding general paralysis and other so-called parasyphilitic affections, as due to latent spirochætal infection rather than to the hitherto generally accepted idea that these affections are due to degenerative effects only remotely connected with the *Spirochæta pallida*. They remark that " it certainly seems possible that in an apparently cured or recovered case of syphilis, an attenuated infection, or a focus, encapsuled, or otherwise rendered temporarily incapable of producing toxic results, and possibly likewise incapable of producing demonstrable 'antibody' formation (meaning thereby the bodies which produce the specific complement deviation of the Wassermann reaction), may exist in the body, capable under special circumstances of being roused into activity and of giving rise to tissue change, local or general, slight or extensive, with the accompaniment of the formation of deviating bodies. . . . That a latent infection may exist, capable after long periods of quiescence of renewed activity, and the production of active pathological changes, can hardly be doubted. The disappearance, under treatment and otherwise, of the Wassermann reaction, and the latency and recrudescence of syphilis in its various forms, may thereby be explained."

Lesser[6] considers that a positive Wassermann reaction always signifies active syphilis. Absolute proof is impossible ; for this it would be necessary to know the lurking-places of the spirochætes during the latent stages, and to show their presence microscopically in every case of positive reaction. Lesser holds that the so far unknown substance present in the blood serum of syphilitics which causes the reaction is not a product of metabolism of the spirochætes, but more probably a normal constituent of the body which is present in greater quantity in the serum of syphilitics. As regards the practical value of the test, from the fact that all general paralytics and most tabetic patients give a positive reaction, Lesser deduces that patients who show a negative reaction in the later stages of syphilis do not run the risk of general paralysis and tabes.

As the result of examination of 525 cases by the Wassermann test, Lesser comes to the following conclusions : (1) Syphilis is only cured in 49 per cent of cases ; (2) A single course of treatment in the early stage is sufficient to cure 39 per cent ; (3) The change in the reaction from positive to negative is proportional to the number of courses in the early stage, with the limitation that the maximum effect is

obtained after four courses (55–65 per cent) ; (4) In the total absence of mercurial treatment a negative reaction occurs only in 15 per cent of cases. If the statement that only one-half of those infected with syphilis are cured appears exaggerated, we must remember that there is often no clinical record of the absence of cure, while the positive reaction remains the only symptom which many syphilitics, who die of some intercurrent disorder, carry to their graves. Lesser sums up as follows : The Wassermann reaction serves as a guide for treatment, in so far as it shows us how long to continue treatment, and when to repeat it. A positive reaction always indicates the presence of active syphilis. A negative reaction is inconclusive in the early stage ; but in the later stage, a negative reaction is in favour of a cure, with increasing probability proportional to the age of the disease. A negative reaction in the later stage is more frequent when several courses of mercury have been administered in the early stage, with the limitation that the maximum therapeutic effect is reached after four courses. The duration of treatment should not depend on the quantity of mercury administered, but in the change from a positive to a negative reaction. The aim of treatment is to gain a permanently negative reaction.

Baisch[7] has attempted to solve the problem of the *transmission of syphilis* by combined serological and bacteriological examination. For this purpose, the newly-born infants, together with both maternal and fœtal portions of the placentas, were examined for spirochætes. Baisch sums up his conclusions as follows : (1) For the investigation of the transmission of syphilis, the Wassermann reaction alone is insufficient, and must be combined with bacteriological examination of the fœtus and placenta. (2) A negative reaction in the parents only excludes syphilis when no spirochætes are found in the child (which must not be too much macerated). (3) The complement-binding substance does not pass through the placenta from mother to child, or inversely. (4) The appearance of the complement-binding substance is due to the presence of spirochætes. (5) Syphilis is a cause of maceration and premature death of the child in 80 per cent of cases ; the rest are due to twisting of the umbilical cord, malformation of the fœtus, nephritis in the mother, and possibly tuberculosis. (6) Habitual abortion in the first four months is usually due to gonorrhœa, not to syphilis. (7) About 75 per cent of all mothers of syphilitic children present little or no sign of syphilis clinically. (8) The mothers of syphilitic children who give a positive reaction are actually syphilitic, in spite of appearing clinically healthy. (9) Even when the mothers give a negative reaction, they are also probably infected ; these cases are due to failure of the reaction. (10) Colles's law of the immunity of the mothers of syphilitic infants, and Profeta's law of the immunity of the children of syphilitic parents, are both explained by the fact that the mothers and children are refractory against infection with syphilis because they are already syphilitic. (11) There are no exceptions to Colles's law. (12) Energetic and systematic specific treatment

before and during pregnancy offers the best chance of obtaining healthy children.

Two excellent articles on the serum diagnosis of syphilis, and on diagnosis by dark-ground illumination, are contributed by Capt. Harrison to the *Journal of the Royal Army Medical College* (June and July, 1910).

Nicolas, Favre, Gautier, and Chartet[8] report the results of their experiments in the production of a cutaneous or intradermic reaction in syphilis on the lines of the corresponding reactions with tuberculin in tuberculosis. The substance used, which they call "syphiline," is a glycerin extract of heredo-syphilitic liver sterilized by heating to 115° C. The cutaneous reaction gave only doubtful results, but the intradermic reaction was more successful. Out of 29 cases of syphilis, 14 cases were strongly positive, 4 feebly positive, 5 doubtful, and 7 negative. On the whole, the reaction was clearly positive in cases of tertiary and quaternary syphilis, but less marked in primary and secondary syphilis. Out of 9 control cases, mostly of other cutaneous diseases, 8 were negative, the only case giving a feebly positive reaction being a case of gonorrhœa. In a more recent communication the same authors report the results of a comparison of the intradermic with the Wassermann reaction. The results obtained seemed to confirm the value of the intradermic reaction, since the two reactions agreed in 42 out of 50 cases. In two cases of undoubted syphilis a positive intradermic reaction was obtained when the Wassermann test was negative. The authors, therefore, think that the intradermic reaction is more useful in doubtful cases than the Wassermann test. The "syphiline" must be made from fragments of heredo-syphilitic liver rich in spirochætes. These are triturated in a mortar after drying, and the powder thus obtained is digested in 10–100 bouillon glycerin at a temperature of 115° C. for fifteen minutes. It is then filtered and reduced by evaporation at 65°. This "syphiline" is diluted with two parts of serum, and one drop is used for injection. The results depend on the manner in which the "syphiline" is prepared.

The same observers have also tried the cutaneous and intradermic tuberculin tests in syphilitics, and come to the remarkable conclusion that syphilitics react to tuberculin in the same proportion as do tuberculous subjects. The intradermic test was positive in 44 out of 47 cases, or 93 per cent; cutaneous test in 21 out of 28 cases, or 75 per cent. These figures are almost identical with those obtained by Mantoux in tuberculous subjects; 97 per cent by intradermic, and 79 per cent by cutaneous test.

Reinfection and Immunity.—Dardenne[9] reports a case of syphilitic reinfection after an interval of nine years. In each instance the patient had typical symptoms of secondary syphilis. The first chancre was near the frænum, the second on the dorsal surface of the coronal sulcus. The author is of opinion: (1) That immunity in syphilis is not absolute, but only relative; (2) That reinfection is possible even when the

tissues are not absolutely free from spirochætes. In support of this view, he mentions the experiments of Finger and Landsteiner on men, which showed that the majority of syphilitics react in a specific manner to the virus in proportion to the quantity of virus injected into subcutaneous pouches. He considers four years' treatment essential. Mercurialization may be compared to vaccination, as it confers only relative immunity, and requires repetition. The relative immunity conferred by mercury is well shown in a case reported by Tushmann; a syphilitic woman gave birth to seven syphilitic children, in the absence of treatment; during the eighth and ninth pregnancies she had mercurial treatment, and gave birth to healthy children; during the tenth pregnancy treatment was neglected, and a syphilitic child was again produced; during the eleventh pregnancy mercury was taken, and a healthy child was born. The author concludes that immunity in syphilis has only a relative signification, and does not imply an absolute cure. Mercury confers temporary immunity against the virus, but this may reveal its existence at any time by causing fresh syphilitic manifestations. As reinfection can take place in tissues which are not absolutely free from spirochætes, it cannot be regarded as a proof that the patient is free from the specific organisms. For this reason the author considers it as necessary, if not more, for a syphilitic to undergo fresh courses of "remercurialization" at intervals, as it is to be revaccinated against small-pox.

Coates[10] also reports seven cases of reinfection, in each instance the patient having had primary and secondary syphilis twice over. In the four cases he mentions, the intervals between the two attacks were five, six, fifteen, and eighteen years respectively. In the first two cases the second attack was more severe than the first. In each case two years' mercurial treatment had been taken, in two cases with grey-powder pills. Coates also mentions two cases in which syphilis relapsed after intervals of twenty and eighteen years, the patients having married and had healthy children in the intervals. Coates cautions against commencing treatment before the diagnosis is definite. As regards excision of the primary sore, he thinks this is doomed to failure, and considers it doubtful whether a chancre can be diagnosed as syphilitic before general infection has occurred.

Absence of Primary Sore.—Waelsch[11] reports four cases of syphilis in which there was no sign of a primary sore, three of the patients being medical men. He regards these as true cases of absence of primary sore (*syphilis d'emblée*). He also mentions six cases of extra-genital chancres, occurring on the fingers of medical men, which developed in the form of paronychia. The sores ulcerated, and were covered with granulations which kept on breaking down. In most cases there was lymphangitis and painful adenitis. As prophylactic measures against such infection he recommends finger-stalls, and condemns the practice of examining women under the bedclothes.

Magian[12] reports a case which is remarkable in two respects: (1) No primary sore was found, although the patient was examined all over

several times a week for eight weeks, commencing a few days after the suspected coitus, and once a week for another month ; in the eleventh week secondary syphilis developed. (2) Within two years, and while still taking mercury and iodides for tertiary syphilis, the patient contracted a hard chancre of the glans penis, which was followed by secondary syphilis. This case supports Dardenne's statement, mentioned above, that reinfection may occur before the patient is rid of the first attack.

TREATMENT.—Duhot,[13] at the Buda-Pesth Congress, 1909, reported the results of his *abortive treatment of syphilis*. His conclusions are based on 208 cases of syphilis observed for upwards of two years, 97 of them for four to twelve years. The conditions necessary for successful abortive treatment are : (1) Commencement before the twelfth day after appearance of the chancre ; (2) Excision of chancre and sterilization of lymphatic glands ; (3) Employment of maximum therapeutic doses, short of overcoming resistance of organism, during first course, followed by chronic intermittent form of treatment. The clinical results were verified by the Wassermann reaction. In twelve patients, the reaction was regularly negative after the first course, in four after the second course, in five patients after the second year, in fourteen after the third year. In three cases where the treatment was commenced on the fifteenth or sixteenth day with doses of 14 cgrams of grey oil, the reaction was negative after the first course, while in two other cases where the dose was only 7 cgrams the reaction only became negative after the second course. In four cases of chancres dating from seventeen to thirty days, the reaction was positive, but became negative after the second course. These results show the importance of commencing treatment before the twelfth day of the chancre. When treatment is commenced about the time when the roseola appears, the latter is not prevented, but it is considerably modified. In a few cases there were no further symptoms after the first course of treatment. Intensive treatment during full evolution of secondary symptoms did not always prevent tertiary symptoms. The frequency of a positive serum reaction and the rapidity of its transformation into a negative reaction are proportional to the energy of treatment, and depend especially on the intensity and precocity of the first course. If intensive treatment is begun before the twelfth day after the appearance of the chancre, there are no further symptoms in 95 per cent of cases, and the serum reaction is proportionally negative. But of the 208 cases treated by the abortive method, there are 97 which are in the tertiary period (from four to twelve years) without having shown any sign of tertiary syphilis. Several of these patients have married without infecting their wives or children.

Fouquet[14] points out, that to be successful, abortive treatment must be administered before the virus has passed into the general circulation. The negative Wassermann reaction in the early stages of the chancre tends to show that the virus at this period is limited to the local lymphatics, and that the disease is thus localized. He

regards excision of the chancre as useless, and employs a method recommended by Hallopeau. This consists in injecting a solution of **Hectine** (20 cgrams to 1 ccm.) around the chancre and along the lymphatics, daily for thirty days; dressing the chancre with a 5 per cent ointment of hectine; also general treatment by daily injections of benzoate of mercury (2 cgrams) for thirty days. After an interval of fifteen days inunction treatment is given, followed by another series of injections. The treatment is continued for six months. [Hectine is a new arsenical preparation, said to be less toxic than atoxyl. See *page* 31.]

Lieven[15] is in favour of treatment by **Inunction,** which he regards as the most certain method in its results, and the most free from risks. He states that roseolar and mucous patches take almost three times as long to disappear under grey-oil injections as they do under inunction. Inunction can be carried out by the patient as follows: From 4 to 5 grams of unguentum cinereum (which Lieven considers to be still the best ointment) are rubbed in daily for twenty minutes, till the skin becomes dry. On the first day both legs are rubbed; on the second day, the right thigh; on the third day, the left thigh; on the fourth day, the flanks and abdomen; and on the fifth day, both arms. On the sixth day, the patient takes a soap-and-water bath for the first time. At Aachen this routine is modified by the patient taking a sulphur bath daily, the parts to be rubbed immediately after the bath being washed with soap and water. The alkaline water softens the epidermis and opens the pores. At the same time the salts and sulphur in the water stimulate cutaneous metabolism. (See also *page* 33.)

Lieven regards **Iodide of Potassium** as superior to all its so-called substitutes (iodipin, sajodin, etc.), which he only uses when iodide of potassium causes severe iodism. In cases where the general condition is bad, owing to alcoholism, malaria, etc., he recommends **Sarsaparilla** in the form of Zittmann's decoction. As regards **Arsenic,** Lieven has abandoned the use of arylarsonates on account of unreliability, and the risk of producing blindness. However, he considers that arsenic administered in tonic doses increases the tolerance to mercury: for instance, injections of 1 ccm. of a 1 per cent solution of arsenate of sodium given three times a week. Contrary to the opinion of most modern authorities, Lieven waits for the appearance of a roseola before commencing treatment, even if the spirochæte is found in the chancre, and the Wassermann reaction is positive in the third week. He says he has never seen any good results from early treatment, but very often early recurrences and an irregular course of the disease. Exception is made for chancres of the lips, etc., which are disfiguring, and dangerous on account of contagion. The duration of the first course of inunction is forty to fifty days, and is combined with subcutaneous injections of arsenate of sodium. Three further courses are given at intervals of six months, with additional intermediate courses in severe cases. Where inunction is impracticable, Lieven uses injections of grey oil, but salicylate of mercury when prompt

action is required. In cases of severe nasal or laryngeal syphilis, or syphilis of the nervous system, appearing a few months after infection, he uses calomel injections, which he regards as a specific for such cases; one or two injections are usually enough, when the usual treatment may be resumed.

(For the employment of **Iron-Saiodin,** see *page* 33.)

At the recent discussion on the diagnosis and treatment of syphilis at the meeting of the British Medical Association,[16] Feibes also supported treatment by inunction, and regarded pill treatment as inadequate. Inunction was a safe method, as it could be stopped at once and the ointment be washed off if mercurial poisoning should occur; whereas with injections of insoluble mercurial preparations the mercury continued to act after the injections were stopped. Lane spoke in favour of treatment by pills, which he considered satisfactory in most cases. He considered two years' treatment insufficient, and recommended five years. In severe cases he used calomel injections. Wild said that the old remedies should not yet be abandoned for the new ones. Mercury reached the blood in the same form (a soluble albumin) whether given by the mouth, by inunction, or by injection, and was stored in the liver for a time. He believed that mercury reached the liver and blood as soon when given by the mouth as by injection, provided the digestion was good.

Combined Mercurial and Arsenical Treatment.—Lambkin[17] reports his experience with a combination of atoxyl and mercury, suggested by Uhlenhuth,[18] and named **Atoxylate of Mercury.** (See also *page* 40.) This is given by intramuscular injection, suspended in olive oil or paraffin, or Lambkin's mixture of creosote, camphoric acid, and palmitin—1 dr. of mercury atoxylate to 9 drs. of vehicle. The doses given are 7 mins. ($\frac{3}{4}$ gr.) for the first two injections; 12 mins. ($1\frac{1}{2}$ grs.) afterwards, up to eight injections. There are intervals of three days between the first three injections, and of seven days between the remaining. After a month's rest, the course of eight injections is repeated. The author states that no toxic effects are produced by this treatment. Among other cases he mentions one of chronic glossitis and leucoplasia, which did not yield to mercury and soamin, but cleared up under atoxylate of mercury.

Miekley[19] also reports good results from this preparation, using a 1–10 emulsion in olive oil. The dose was 0·5 gram; the total quantity injected was 5 grams. In view of the possible effect on the optic nerve by atoxyl, careful observations were made, but no sign of optic atrophy was found. The advantages claimed for atoxylate of mercury are: Rapid effect on papular and ulcerative processes; smallness of dose, the course only introducing 0·16 gram of mercury; comparative painlessness of injections.

Fraenkel and Kahn[20] report good results from intramuscular injections of **Enesol,** a soluble salt of mercury and arsenic. The dose was 1 cc., increasing to 2 cc., given daily for periods of ten days, with intervals of four or five days between each period.

Baily and Gibbs[21] have attempted to test the comparative value of various antisyphilitic methods of treatment by means of the Wassermann reaction. In the first place, Baily considers his modification of the original technique superior to Fleming's modification of Hecht's and Bauer's techniques. As regards Noguchi's method, by which the complement and hæmolytic antibody are used dry on filter paper, he says that the question as to the rate of loss or alteration of complemental content has not yet been sufficiently worked out to enable us to use this method with confidence. The authors point out that the Wassermann reaction is too recent to decide the question of permanent cure; nevertheless, it is a useful guide in judging the effect of treatment. As the result of their investigation of cases treated by pills, inunction, injections, suppositories, potassium iodide, and arylarsonates, the authors conclude that "inunction is the most rapid method of getting the patient under mercury, that calomel injections are second, and that pills and suppositories are a long way behind." Potassium iodide had no effect on the reaction, and only one case out of fifteen treated with arylarsonates (ten injections of 10 grs.) gave a negative reaction.

The Dangers of Arylarsonates.—Attention has been drawn to the dangers of the new arsenical preparations—atoxyl, arsacetin, soamin, etc.—owing to the numerous cases of blindness which have occurred as the result of their administration in syphilis and sleeping-sickness, and on account of this danger many syphilologists have abandoned them. Coates[22] gives a résumé of cases published in the *Bulletin of the Sleeping-sickness Bureau* (No. 8, 1909). "In this, Professor Dr. Max Beck notes that Watermann treated four cases of optic atrophy with atoxyl, and in each case the vision became markedly worse. He also describes 23 cases of complete, and 7 of partial, blindness, out of 1633 patients treated with atoxyl at Sesse by the members of Koch's expedition. Drs. A. van Gehuchten and A. Tils describe the case of a man (infected by trypanosomes) who became blind after treatment with atoxyl. Two series of cases treated by Gray are also recorded. In the first 1135 cases, 47 had alterations of vision and 20 became totally blind. In the second series of 1712 cases, 70 had dimness of vision, and 10 became totally blind; in 2 of the latter mercury was given with atoxyl." Paderstein[23] published twelve cases treated with atoxyl and two with arsacetin, all followed by amblyopia, varying in severity from actual blindness to contraction of the field of vision. Paderstein's patients were Europeans; those of Beck and Gray natives of Uganda. Lane[24] reported a case of optic atrophy occurring suddenly after ten injections of orsudan, and mentions three other similar cases following injections of soamin.

At the discussions on the treatment of syphilis at the Royal Society of Medicine (June 7 and 14, 1910)[25] and at the British Medical Association Meeting (July, 1910),[26] the general opinion was strongly against the use of arylarsonates. At the latter meeting, Wild said he had seen signs of general neuritis supervening after treatment by arylarsonates.

He also found that arsacetin left the body in the form of atoxyl, which could be detected in the urine, so that the claim for arsacetin that it is less toxic than atoxyl is probably false. (See also *page* 12.)

Ehrlich's New Arsenical Preparations.—These are (1) Arsenophenylglycin; (2) Dioxydiamidoarsenobenzol, otherwise known as the **Ehrlich-Hata Preparation,** or **"No. 606."** (See also *page* 14.) Both these preparations are said to have remarkable curative effects on protozoal diseases, and also to be free from the dangerous toxic effects of atoxyl and arsacetin. According to Neisser, arsenophenylglycin cures dourine in horses, and both preparations syphilis in apes. The Ehrlich-Hata preparation has been found by Mackintosh[27] to cure recurrent fever in rats (due to *Spirochæta obermeieri*), the parasites disappearing from the blood after one injection; and Iversen[28] has reported similar cures in human relapsing fever. But the most astonishing results are reported in the treatment of human syphilis.

Neisser[29] reports his experience with "606" in 100 cases, including primary, secondary, tertiary, and latent syphilis, cerebral and spinal syphilis, tabes and general paralysis, and interstitial keratitis; also three cases free from syphilis, including psoriasis. With regard to the results, he remarks, "In nearly all cases in which visible symptoms are present, these undergo resolution and disappear in a manner which is simply dumbfounding. Primary sores became soft and lose their induration; spirochætes often disappear in twenty-four hours from primary sores and condylomata; macular and papular syphilides, and also the very resistant small papular syphilide, subside, and become simple pigment spots; mucous patches disappear; hard enlarged glands become small and soft; gummata soften and lose their painfulness; the ulcers of tertiary and malignant syphilis become clean in a few days, and rapidly become cicatrized; paralytic symptoms and pain in cerebral syphilis diminish in the course of a few days or even hours. In short, there is no doubt as to the remarkable action of arsenobenzol on syphilitic processes, surpassing everything which has hitherto been seen from the most striking effects of mercury or iodide. This action not only causes the disappearance of previously numerous spirochætes, but also extends to the pathological process itself. I must admit that, hitherto, I had considered it theoretically impossible for inflammatory infiltrations to be absorbed and disappear so rapidly as we have seen them do." However, these remarkable results do not occur always, for Neisser mentions cases in which there is retarded action, or apparently no effect at all from the drug. Sometimes spirochætes were still present after nine or ten days; some cases of tertiary syphilis took a long time to heal, and cases of interstitial keratitis were not benefited at all. Neisser thinks that these failures may be due either to too small a dose, or to conditions of local circulation (as in the cornea) which prevent rapid circulation of the drug. In some cases relapses occurred after the single injection, which he also attributes to too small a dose. Further, the rapidity

of action of the drug depends on whether it is injected in a soluble or insoluble form, and whether it is injected intravenously, intramuscularly, or subcutaneously. As to the ultimate results, it is too early yet to speak.

With regard to the effect of this drug on the Wassermann reaction. Neisser's results do not agree with those of other observers; while Wechselmann reported a transformation of positive into a negative reaction in nearly 100 per cent of his cases, Neisser only obtained it in 44 per cent. The earliest date at which the transformation took place was thirteen days, in most cases from twenty to thirty days after the injection (0·3 to 0·4 gram). The earlier after infection treatment is administered, the more chances are there of a permanent cure. Neisser mentions three cases of primary syphilis treated soon after infection, which he thinks may be permanent abortive cures, as they gave a negative Wassermann reaction when tested at intervals after the injection. He states that although an abortive cure may be obtained by early intensive mercurial treatment, it would appear to be more easily and rapidly attained by Ehrlich's remedy. With regard to the secondary effects caused by the latter, these may be local or general. Local effects depend on whether the drug is injected intravenously, intramuscularly, or subcutaneously. The former cause no local disturbance, but intramuscular and subcutaneous injections give rise to pain and infiltration. These vary according as the drug is dissolved or suspended, and also according to its reaction: the more neutral the latter, the less the pain and infiltration. Neisser does not think it necessary for patients to remain in bed. Wechselmann gives subcutaneous injections below the scapula; Neisser prefers intramuscular injections into the glutei, avoiding the neighbourhood of the sciatic nerve. It is important that the injected fluid should be in the form of a fine suspension of the drug, and as near neutral as possible; in this form, pain is much diminished. Whether this advantage of the neutral suspension is counterbalanced by the slower action of the drug in its insoluble form, as compared with the more rapid action of the painful alkaline solution of the drug originally used, remains to be seen.

The general secondary effects include rise of temperature, shivering, and vomiting, which, however, only last a few hours. Neisser remarks that the rise of temperature occurs too rapidly after injection to be due to local inflammatory reaction; he therefore considers it a specific reaction, possibly due to the liberation of endotoxins from destruction of a great number of spirochætes. The rise of temperature is chiefly observed in comparatively early cases of syphilis, and does not occur in non-syphilitic cases. This explanation of the rise of temperature is supported by the occurrence of a local reaction in the cutaneous syphilides, which become reddened, and often surrounded by an inflammatory halo from four to twenty-four hours after the injection. This reaction, which is also sometimes observed after rapid mercurialization, and is known as the Jarisch-Herxheimer reaction, has also

been attributed to the direct action of the drug on the spirochætes; destruction, with liberation of endotoxins, or irritation, causing them to secrete more toxin. Neisser observed no injurious effects from "606" on the kidneys, intestine, heart, or nervous system; on the other hand, the patients are said to have gained in weight and improved in general health.

Neisser considers that "606" has a direct destructive action on the spirochætes, for the following reasons: (1) Their rapid disappearance from primary sores after the injection, the rapidity being greater after intravenous than intramuscular injection, and with the alkaline solution than with the neutral suspension. (In non-syphilitic cases treated by Neisser, the remedy had no effect; the cases included psoriasis, warts, leukæmia, and neurodermatitis); (2) The occurrence of local and general reactions, mentioned above, which only occur in syphilitics; (3) The influence on the serum reaction, a positive reaction being transformed into a negative in 44 per cent of cases (others have obtained larger proportions); (4) From experiments on animals, three syphilitic apes being successfully re-inoculated with syphilis a month after injection of "606." That the drug has also an inhibitory action on the development of spirochætes was shown, in the case of apes, by inoculating the animals with syphilis twelve days after the injection of "606," when the primary sore developed eighteen to fifty-five days later than in the control animals. Neisser remarks that if ever it may be thought advisable to repeat the injections, the question arises whether the spirochætes will not become resistant to the action of the drug, in which case repeated injections will be useless.

In conclusion, he states that, in his opinion, Ehrlich's new remedy is indicated in all cases of syphilis with manifest symptoms, and possibly also in latent cases; that in some it may be found useful to combine it with mercurial or iodide treatment; that in cases of early syphilis a radical abortive cure may be attained by "606," but if we wish to be especially circumspect it may be combined with mercurial treatment; that such abortive treatment may be useful in persons, such as prostitutes, who are repeatedly exposed to infection; that "606" is indicated in cases which cannot take mercury, or which have taken too much mercury, and in parasyphilitic affections such as leucoplakia, tabes, and general paralysis. As regards leucoplakia, Neisser has no permanent results to report with arsenobenzol, but he mentions a case which remained healed for seven months after treatment with arsenophenylglycin. He thinks it possible to prevent the development of general paralysis, because this affection apparently only occurs in syphilitics who still harbour the virus, as shown by the positive Wassermann reaction. With regard to tabes the conditions are somewhat different, as there are cases of progressive tabes with a permanently negative reaction. Neisser suggests that in these cases the degenerative processes have commenced in the early stages of the disease and have been uninfluenced by treatment, and that these changes continue after the syphilis itself is cured.

PRIMARY SYPHILIS TREATED BY "606." *Photographs of patient under Dr J H. Sequeira.*

Primary sore on the lower lip. The fluid from the chancre contained many spirochætes. Wassermann reaction positive. Twelve hours after injection no parasites could be detected. The second photograph shows the condition of the patient eight days after treatment. There have been no secondaries. The Wassermann reaction was negative three weeks after treatment.

PLATE XLII.

TREATMENT OF SYPHILIS BY "606." *Photographs of patient under Dr. J. H. Sequeira.*

Copious macular and papular eruption. The glands were generally enlarged. The second photograph illustrates the condition of the patient fourteen days after injection with "606." The eruption has cleared up, but a little staining still remains. This patient has since had an attack of iritis and retinitis, which is again under treatment with "606."

He recommends "606" in all cases of tabes and general paralysis in which recent symptoms are present, but symptoms due to permanent destruction of nerve tissue cannot be expected to improve. However, he mentions the possibility of degenerated nerves being still further damaged by the arsenic contained in "606," and on this account does not advise it in cases of optic atrophy. The drug is also contra-indicated in cases of parenchymatous degeneration of the heart and other vital organs. Neisser concludes: "Even if syphilis can never be exterminated, by proper use of the new weapon which has been placed in our hands it may lose the greatest, if not all, of its terrors."

Remarkable results from "606" are also reported by Alt,[30] Schreiber,[31] Treupel,[32] Gluck,[33] and Wechselmann,[34] some cases of malignant syphilis and cases which had failed to improve under mercurial treatment being treated by the new drug. Michaelis[35] has reported a case of congenital syphilis in an infant five weeks old, in which a general macular syphilide and palmar and plantar syphilides disappeared a week after an injection of 0·03 gram of "606." More remarkable still are cases reported by Duhot[36] and Taege,[37] in which the signs of congenital syphilis disappeared from infants at the breast after the mother had been treated by "606."

Géronne[38] is more reserved in his opinion, and does not regard it as a "therapia sterilans" for every form of human syphilis. He thinks it sufficient if Ehrlich has found a powerful chemical weapon against syphilis, a weapon which, if free from secondary harmful effects, may be a substitute for mercury in suitable cases. Relapses took place in some of his cases after watching for thirteen weeks, and the Wassermann reaction, which had become negative after the injection, again became positive.

Wechselmann and Lange[39] describe a method of preparing "606" to avoid the painful effects of the earlier preparations, but as the drug is not yet on the market, and as further improvements may be made later on, there is no necessity to give the details.

In England, "606" has been tried at the Lock Hospital by McDonagh,[40] who gives the results of twenty cases treated by this method. They fully confirm the reports of Continental investigators.

As regards the toxic effects of "606," no case of optic atrophy, which sometimes occurred after atoxyl and arsacetin, appears so far to have been reported. However, Bohac and Sobotka[41] relate three cases out of fourteen in which toxic effects were produced, including retention of urine, rectal tenesmus, and diminution in the patellar reflex. If the fatal case reported by Fraenkel and Grouven[42] cannot be attributed entirely to the effects of the drug, since the autopsy revealed extensive disease of the brain, heart, kidney, and liver, nevertheless it shows that the drug is contraindicated in some cases.

[We are indebted to Dr. J. H. Sequeira for kindly supplying us with the photographs of *Plates XLI and XLII*.—Ed.]

References.—[1]*Lancet*, Ap. 2, 1910; [2]*Pract.* Feb. 1910; [3]*Johns Hop. Hosp. Bull.* Mar. 1910; [4]*Münch. med. Woch.* Ap. 26, 1910; [5]*Brit. Med.*

Jour. Oct. 9, 1909 ; [6]*Deut. med. Woch.* Jan. 20, 1910 ; [7]*Münch. med. Woch.* Sept. 21, 1909 ; [8]*Soc. Méd. d. Hôp. de Paris*, Mar. 3 and Ap. 22, 1910 (*Ann. des Mal. Vén.* July, 1910) ; [9]*Lancet*, Oct. 9, 1909 ; [10]*Brit. Med. Jour.* May 7, 1910 ; [11]*Münch. med. Woch.* Ap. 27, 1909 ; [12]*Brit. Med. Jour.* Sept. 11, 1909 ; [13]*Ann. des Mal. Vén.* June, 1910 ; [14]*Gaz. méd. Belge*, June 23, 1910 ; [15]*Polycl.* Aug. 10, 1910 ; [16]*Lancet*, Aug. 6, 1910 ; [17]*Ibid.* Jan. 1, 1910 ; [18]*Deut. med. Woch.* July 7, 1910 ; [19]*Ibid.* Oct. 14, 1909 ; [20]*Wien. med. Woch.* Feb. 13, 1910 ; [21]*Lancet*, May 7, 1910 ; [22]*Brit. Med. Jour.* May 7, 1910 ; [23]*Berl. klin. Woch.* Mar. 31, 1909 ; [24]*Brit. Med. Jour.* Mar. 5, 1910 ; [25]*Clin. Jour.* June 29 and July 6, 1910 ; [26]*Lancet*, Aug. 6, 1910 ; [27]*Ibid.* Sept. 3, 1910 ; [28]*Münch. med. Woch.* No. 15, 1910 ; [29]*Berl. klin. Woch.* Aug. 8, 1910 ; [30]*Münch. med. Woch.* No. 11, 1910 ; [31]*Ibid.* No. 27, 1910 ; [32]*Deut. med. Woch.* July 28, 1910 ; [33]*Münch. med. Woch.* Aug. 2, 1910 ; [34]*Berl. klin. Woch.* July 4, 1910, *Deut. med. Woch.* Aug. 11, 1910 ; [35]*Berl. klin. Woch.* July 25, 1910 ; [36]*Münch. med. Woch.* No. 34, 1910 ; [37]*Ibid.* No. 33, 1910 ; [38]*Berl. klin. Woch.* July 11, 1910 ; [39]*Deut. med. Woch.* No. 34, 1910 ; [40]*Lancet*, Sept. 3, 1910 ; [41]*Wien. klin. Woch.* July 28, 1910 ; [42]*Münch. med. Woch.* No. 34, 1910.

SYPHILIS, CONGENITAL. (*See above, also* EYE, DISEASES OF.)

SYRINGOMYELIA.

X-ray treatment of (*page* 79).

TABES. (*See* NERVOUS SYSTEM, SURGERY OF.)

TABETIC PAINS.

(*Vol.* 1910, *p.* 24)—**Desalgin**, a combination of chloroform with albumin, is recommended by Schleich for internal administration in doses of dr. ½.

TARSALGIA. (*See* ANTERIOR TARSALGIA.)

TESTICLE, AFFECTIONS OF. *Priestley Leech, M.D., F.R.C.S.*

Cancer.—All surgeons are aware that the ultimate results of operation in cases of cancer of the testicle are bad, for if recurrence does not take place in the stump of the spermatic cord, the lumbar lymphatic glands later become infected with cancer, and lead to the patient's death. Bland-Sutton[1] thinks that the same principles should hold in this operation as in those now performed for malignant disease of the breast, tongue, and uterus. In a man of thirty-one years of age with cystic disease of the right testicle, he did the following operation :— The testicle is first forced from its scrotal investment, and the cord isolated so far as the internal abdominal ring ; some of the loose scrotal skin is removed, and the vessels are tied. The testicle is then wrapped in sterilized gauze ; the surgeon puts on a fresh pair of gloves, and an incision is made in the linea semilunaris from the costal arch to the opening in the inguinal canal ; all the structures of the abdominal wall are divided down to the peritoneum. Pulling on the testicle shows the position of the spermatic vessels lying in the loose areolar subperitoneal tissue ; the vessels are ligatured just before their termination in the vena cava. The vas deferens and its artery are ligatured and divided at the brim of the pelvis. Glands are then searched for along the cava and aorta. In spite of the extensive area opened up, there is very little loss of blood. Bland-Sutton by this method of operation removed an infected gland lying on the inferior

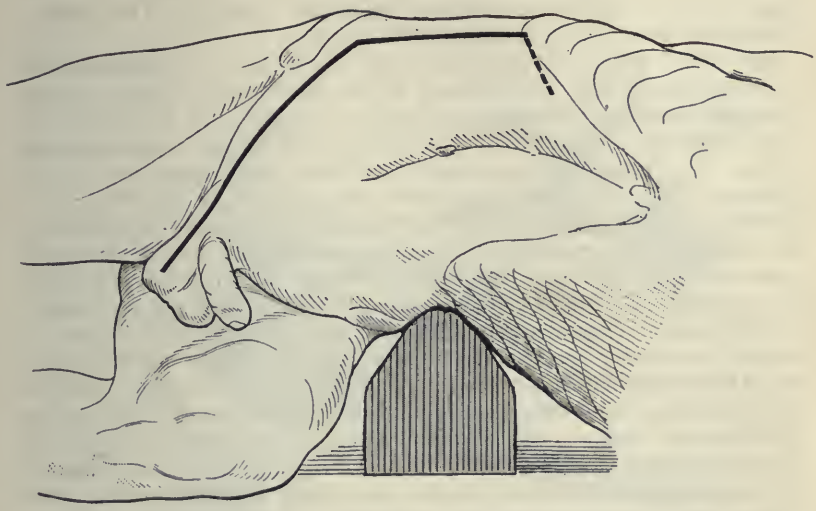

Fig 68.—Chevassu's Operation for Cancer of Testicle. Shows skin incision.

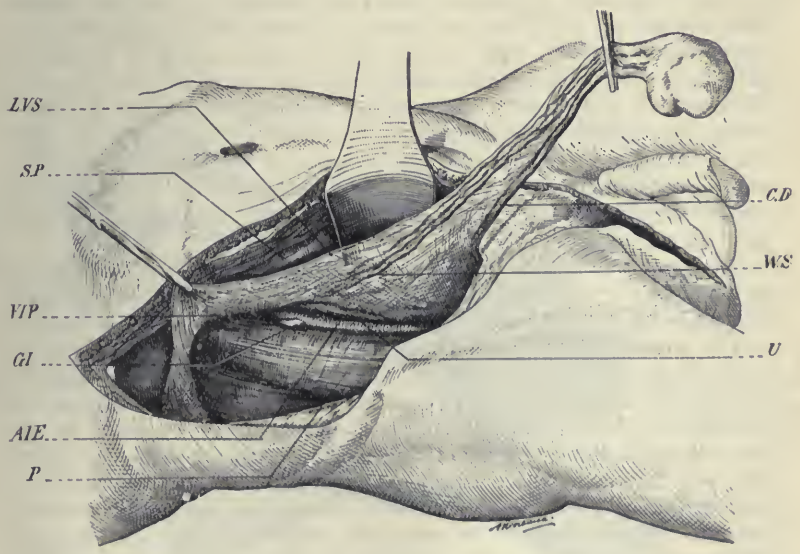

Fig. 69.—Chevassu's Operation for Cancer of Testicle. (*GI*) Iliac glands; (*AIE*) External iliac artery; (*CD*) Vas deferens; (*U*) Ureter.

vena cava; microscopical examination showed the gland to be the seat of cystic malignant columnar-celled new growth. The patient recovered, with perfect healing of the wound.

Chevassu[2] has a very good article on this subject. He suggested in 1906, in his thesis,[3] the removal of the lumbo-aortic glands. Most surgeons doubt the possibility of the cure of cancers of the testicle by castration, but he says that certain cancers can be cured by castration alone. M. Pousson even goes so far as to say that any search for the lymphatic glands in order to remove them is useless, as he believes the results will be the same. Chevassu has followed up 100 cases, and 19 of these are alive without recurrence more than four years after operation; 2 cases were operated on between nine and ten years ago. In arranging the cases histologically there were 47 cases of seminal epitheliomata (seminomata), 3 cases of sarcoma, and 50 cases of mixed tumours. Among this latter class are three subdivisions: (1) Teratomata (benign tumours); (2) The true mixed tumours, polymorphous or heteromorphous, originally innocent, but having an extreme tendency to take on malignant action; (3) Epitheliomata, sarcomata, placentomata, etc., in which one cannot find any of the elements of a mixed tumour (cartilage, unstriped muscle), but which have absolutely the same structure as certain of the malignant degenerations of the true mixed tumours. The proportion of cures is as follows: Out of 47 cases of epitheliomata, 31 are dead (two-thirds) and 16 are cured (one-third). Sarcomata, 3 cases, all died before eight days after operation. Mixed tumours, 50 cases: 47 dead, 3 cured. In 20 of these cases recurrence took place during the first six months after operation. Of the 37 cases of apparently mixed tumours degenerated, 35 died, and 2 were cured; one of these is living six years and seven months after operation, and one eight years and six months. All the deaths in cases of epitheliomata have occurred within three years after castration, so that if a patient lives this length of time there is hope that he may be definitely cured. The size of the tumour bears no relation to its curability, as some cases with small tumours have died, and others with large tumours have been cured.

The lymphatic glands of the testicle are three or five in number on each side of the aorta, at the level of the kidney, and on the right side they lie upon the vena cava. Above, their extent seems to be limited by the aortic origin of the renal arteries; and below they may extend as far as the division of the cava and aorta. There is also another gland which is almost constantly present, and lies lower down upon the termination of the external iliac vein, just where it is crossed by the ureter. Small glands are also found along the course of the cord. He cites several cases where surgeons have removed, or attempted to remove, large masses of lumbar glands infected by malignant testicular tumours and he wisely lays down the following rule: Any surgical intervention in cancer of the testicles is contraindicated when there exists a clinically appreciable growth at the level of the lumbar aortic

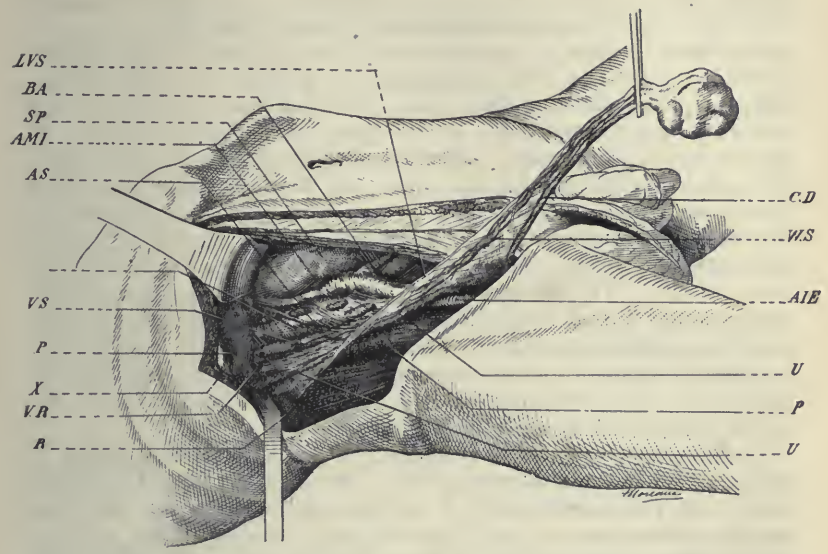

Fig. 70.—Chevassu's Operation for Cancer of Testicle. (*AS*) Spermatic artery; (*VR*) Renal vein; (*R*) Kidney; (*CD*) Vas deferens; (*AIE*) External iliac artery; (*U*) Ureter; (*P*) Psoas muscle.

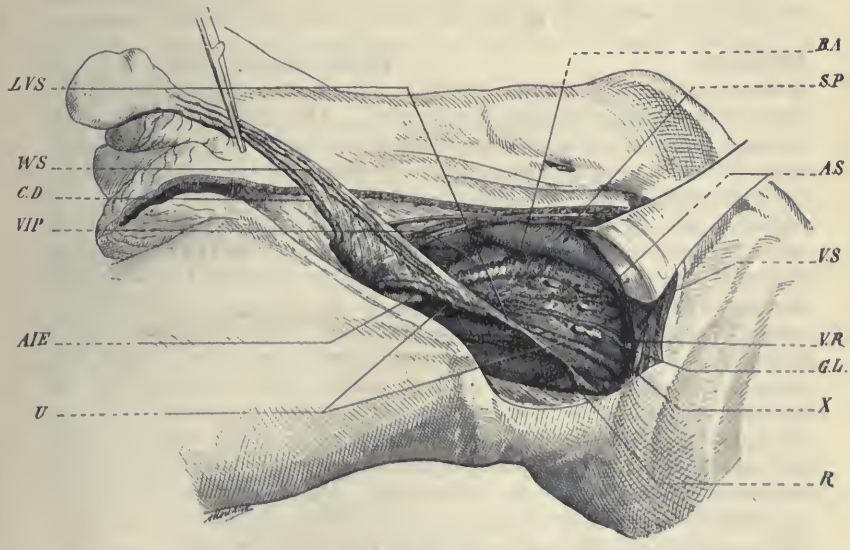

Fig. 71.—Chevassu's Operation for Cancer of Testicle. (*AIE*) External iliac artery; (*U*) Ureter (*GL*) Iliac glands; (*R*) Kidney.

glands; this rule does not apply to metastases in the inguinal glands, or in the external iliac glands below the division of the aorta.

Including the case of Bland-Sutton's, quoted above, there are ten cases of removal of the lumbar glands in cancer of the testicle. Chevassu gives notes of these cases, including two of his own. The mortality is not great. He recommends the following incision: It commences in the scrotum, passes above Poupart's ligament to a little above the anterior superior iliac spine, and then vertically upwards in the anterior axillary line as far as the false ribs; the muscles are divided on the fingers, and then the peritoneum is pushed back towards the vertebral column. This incision allows the surgeon to have everything in view. The transperitoneal route is much more inconvenient; the intestines are an obstruction and cannot be pushed out of the way as in the subperitoneal route. The removal of the cancer and infected lymphatics should be done from below upwards. In separating the peritoneum, it is better to leave the ureter on the posterior wall, and not to take it forward with the peritoneum.

Undescended Testis.—Bland-Sutton,[4] in an interesting address on the value of the undescended testis, comes to the following conclusions: (1) The imperfections of an undescended testis are the cause, not the consequence, of its failure to reach its goal in the scrotum. (2) An undescended testicle is more liable to malignant disease than one which is normally lodged in the scrotum. (3) Surgical efforts to preserve a retained or a partially descended testis (e.g., as in radical cure for hernia) may be described as a work of supererogation.

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TETANUS. *Purves Stewart, M.D., F.R.C.P.*

The dramatic symptoms of this malady have been familiar to physicians since the days of Hippocrates. The infective nature of the disease, however, was only established a quarter of a century ago, when Nicolaier identified the tetanus bacillus. In 1890 Ehrlich showed experimentally that the tetanus bacillus produces its effects, not directly, but by means of a toxin which exercises a selective action upon the spinal cord. This luminous discovery has led to numerous attempts to combat the tetanus toxin. The prognosis in untreated cases, according to Rose's statistics, is always grave, especially in cases where tetanus symptoms supervene early after the original infection. The mortality of untreated cases varies from 91 per cent in early to 50 per cent in delayed cases. But, whatever be the channel of entrance of the tetanus bacillus, the symptoms produced by its toxin are rarely limited to one part of the body, except in cases of head-tetanus, where the symptoms are preponderatingly (though not exclusively) confined to that region. The widespread distribution of symptoms is due to diffusion of the toxin throughout the body, with a selective action upon the motor nervous system.

TREATMENT.—This, as Bongioannini[1] points out in an excellent

résumé of the subject, is fourfold : (1) Treatment of the wound or site of entrance of the tetanus bacillus ; (2) General and dietetic treatment ; (3) Specific serum-therapy ; (4) Medicinal treatment.

Before Ehrlich demonstrated that the symptoms are due not to the bacillus itself but to its toxin, the usual treatment was to excise the wound, or to amputate the infected part, together with a surrounding margin of sound tissues. But since it has been shown that the toxin is the real cause of the symptoms, it has become recognized that as regards the wound itself, treatment by strict antiseptics, whether by heroic measures such as caustics or the actual cautery, or by strong antiseptic solutions, is sufficient. More recently, injections of anti-tetanus serum have become a routine procedure, as a preventive measure, without waiting for symptoms to develop.

As regards general and dietetic treatment, bearing in mind the excessive irritability of the spinal cord in these cases, everything should be done to eliminate external stimuli. Thus, the patient should be secluded in a quiet room, with as few people as possible to see him. The nurses should do everything in their power to avoid moving him unnecessarily. Of late years, blue light has been held by some to have a specially soothing effect. This is attained by the use of blue glass or of blue window-curtains. Liquid or semi-solid foods which can be readily swallowed, are to be given. If spasm of the muscles of mastication is so severe as to prevent feeding by the mouth, we may have recourse to nutrient enemata, to nasal feeding (if necessary, under chloroform), or even to subcutaneous injections of olive oil in large quantity (200 cc.). Fortunately, most cases, when carefully fed, are able to swallow liquids. **Hydrotherapeutic** measures are also valuable. Prolonged hot baths not only have a sedative effect and tend to relax the tetanic spasms, but also protect the patient from such accidents as bedsores or cutaneous abrasions.

Serum-therapy may be employed for prophylaxis or for treatment. The life of the tetanus bacillus in the wound, although a brief one, is sufficiently long to produce a lethal amount of toxin which becomes diffused throughout the body, whether conducted by the nerve-trunks, as some authorities hold, by the lymphatics, or by the blood-stream. The injection of tetanus antitoxin may be subcutaneous, intraneural, intrathecal, or even intracerebral through a trephine hole in the skull. Be this as it may, its most efficacious action is exerted upon that portion of the toxin which is actually in the circulation. Once the toxin has reached the spinal cord, its affinity for the nerve-cells is so great that the antitoxin is less powerful in its effects. It is therefore of importance to administer it as early as possible after the moment of infection. The longer the interval which has elapsed after the infection, the larger should be the quantity of antitoxin administered.

Hypodermic injection of antitoxin is now practised by many surgeons as a routine method of prophylaxis in every case of contused wound when there is a possibility of contamination with earth or other likely nidus of tetanic infection. Hecker found tetanus bacilli present in

18 per cent of all ordinary wounds. Once tetanus has actually developed, it appears extremely doubtful whether antitetanic serum, administered hypodermically, is able to exercise any curative effect.

Intracerebral injections, originally introduced by Roux and Borrel, have now been practically abandoned. They offer no advantage over intrathecal injections. On the contrary, they add to the tetanus itself the additional risk of a trephining operation; moreover, antitoxin introduced by this route is not directed directly towards the spinal cord, which is the part chiefly affected. Finally, cases of cerebral abscess have occurred at the site of intracerebral injections.

Intrathecal administration of antitoxin, through a lumbar-puncture needle, possesses many advantages over other methods of administration. By this means, the antitoxin is brought into immediate relation with the spinal cord. A temporary pyrexia, varying from 1° to 3° F., generally follows such injections. The results as regards cure are better than by any other method. It should be remembered, however, that lumbar puncture may be a matter of considerable difficulty in tetanus cases, owing to the muscular rigidity and opisthotonos which are so often present. We should not hesitate to give a general anæsthetic, if necessary, in order to perform our thecal puncture.

Intraneural injections of antitoxin have also been employed, on the theory that the path of infection from the original wound is largely along the nerve-trunks. Thus, for example, in an infected wound of the upper limb, the cords of the brachial plexus have been injected with antitoxin. But the results thus obtained have not been shown to be better than, or even so good as, when the serum is injected subcutaneously as a preventive measure, or intrathecally after development of tetanic symptoms.

Numerous sedative drugs have been employed, and it is important to remember that if drugs are to do good in this malady, they must be given in maximum doses, and pushed so as to produce their full physiological effects. **Opium,** or **Morphia,** has been found beneficial since the remotest times, the action of this drug being partly to combat the insomnia, partly to relieve the painful spasms. Morphia may be administered hypodermically, by the mouth, per rectum, or by intrathecal injections. **Curara** has been given by some physicians, but the drug is uncertain in its action; moreover, it merely substitutes a muscular paresis for a muscular cramp, and leaves untouched the hyper-excitable cells in the spinal cord. Extract of **Physostigma,** in doses of $\frac{1}{4}$ to 1 gr. every hour, has frequently been used, and with some success, with the object of paralyzing the voluntary muscles, stopping short of arresting respiration. Various other cerebral sedatives and hypnotics have also been recommended, including **Paraldehyde, Chloral Hydrate, Chloretone,** etc. All of these have a beneficial effect in this disease, though their action cannot be more than symptomatic. Most of them have been discussed in detail in former volumes of the *Medical Annual* (1904–10). Spinal anæsthetics, such as **Eucaine,** administered by intrathecal injection, sometimes in combination with

morphine, have also been successfully employed. **Magnesium Sulphate** in 25 per cent solution administered by the same route, has been used for a similar purpose, and with encouraging results.

Carbolic Acid, originally introduced by Baccelli in 1888, has been more extensively employed in Italy than in any other country. The results obtained by its use have been highly encouraging. It appears to have a specific antagonistic effect upon the tetanus toxin. It is administered hypodermically in an aqueous solution of a strength of 2 or 3 per cent, injecting from 1 to 2 cc. at a time, and repeating it every hour for days. No symptoms of carbolic poisoning have been noted in tetanus cases, and the beneficial results have been striking as regards the alleviation of tetanic spasms of the jaws, limbs, and trunk, the pyrexia also subsiding in a satisfactory manner.

Almagià has made experimental observations on the action of **Cholesterin** as a method of treatment. He was able to demonstrate that the tetanus toxin has a special affinity for cholesterin and for lecethin, tending to combine with both these substances in the nervous system. Accordingly, it was considered possible that by giving the patient cholesterin the toxin might thereby be fixed before it reached the central nervous system and formed a stable combination. A 1 per cent solution of cholesterin was therefore administered hypodermically in certain cases of tetanus. In one patient 150 cc. of the solution were administered daily Three patients were thus treated by Almagià, and all of them recovered. On the other hand, Landsteiner and others, repeating Almagià's observations, failed to demonstrate any definite beneficial effect from cholesterin medication. The matter may therefore be considered as still *sub judice*.

REFERENCE.—[1]*Gaz. deg. Osped.* May 19, 1910.

THORACIC SURGERY.

Dr. Gundermann, Marburg.
(Assistant to Professor Dr. F. Sauerbruch.)
Translated by
E. W. Hey Groves, M.S., F.R.C.S.

The introduction in 1904 of differential-pressure methods has made it possible for the first time to construct a systematic method in dealing with the interior of the chest; and the numerous clinical and experimental studies which have recently appeared, indicate that its technical details and clinical utility are being further elaborated.

The important practical question of the comparative value of the positive- and the negative-pressure methods must be first considered. Both are based on the fact that the closed thorax acts under a negative pressure, and in the opened chest the expansion of the lung can only be accomplished by overcoming this negative pressure.

The Negative-pressure Method (Sauerbruch) attains this object by opening the chest in a chamber in which the atmospheric pressure has been reduced by the required amount. The head of the patient remains outside this chamber, exposed to the natural pressure of the air. The effect of this arrangement is the attainment of an *extra-pulmonary negative pressure*.

The Positive-pressure Method overcomes the difference of pressure by means of an *intra-pulmonary positive pressure.* Compressed air or oxygen is breathed into the lung, whilst the exterior of the lung is exposed to the ordinary atmospheric pressure. Whilst all the apparatus for positive pressure attain a uniform raising of the intra-pulmonary pressure, only those of Brauer and Engelken do this by means of a large cabinet containing the head.

With all apparatus which dispense with the head cabinet, and convey the increased air-pressure to the bronchial system by means of a simple face-piece, a constant pressure cannot be maintained. But it is just this which is essential for the differential-pressure method. Strictly such apparatus is not one of differential pressure, but merely a substitute for it. Their great advantages are simplicity and portability; but this involves certain drawbacks, viz. :—

1. Inconstancy of pressure. Somewhat marked variations in pressure occur, similar to those produced by artificial respiration.

2. The breathing, especially expiration, is embarrassed by the small mask, and as expectoration is hindered, a retention of secretion may lead to pneumonia.

3. The use of pure oxygen is not without danger, as its prolonged respiration may give rise to symptoms of poisoning.

4. If vomiting occurs, the mask must be withdrawn, and the increased pressure suddenly fails, with the consequent collapse of the lung. Fatal results have been known to follow.

5. The hurried change of the gas cylinder may result in a cylinder of nitrogen or carbonic acid gas being substituted. Several cases are published in which this accident caused death. We ourselves lost a valuable dog by the administration of a deep breath of pure carbonic acid gas whilst the pericostal suture was being performed.

These risks are of course reduced to a minimum in the construction of the various types of apparatus, by every possible means: but we have the right to require that any such apparatus shall be absolutely steady and precise in its action, and that both operator and anæsthetist shall be able to work undisturbed. These substitutes for the more elaborate forms of apparatus are suited for places where there is not space for the latter. There are many conditions where the former are especially suitable by reason of their simplicity: for most cases of experimental work on animals, for goitre operations to prevent the collapse of the trachea, in carrying out the so-called pressure anæsthesia, to combat sudden asphyxia, and in changing the dressings under conditions where pressure difference must be maintained. For the latter purpose the apparatus of Kuhn-Botsch and of Meltzer-Auer are not suitable, because they require intubation. W. Meyer has specially urged the disadvantages of these latter forms of mechanism :—

1. "Its weak points are the use of the human trachea as a vital part of the apparatus; the possibility of aspiration at the beginning of the operation, with subsequent pneumonia, and of interstitial emphysema at the end of the operation as a consequence of its

employment; also the deep anæsthesia required. In the human trachea, intubation reaching below the glottis has been found to give rise to a copious secretion of mucus.

2. "Sudden complete interruption of the differential pressure, followed equally suddenly by its immediate restoration, as practised in continuous intratracheal insufflation, is liable to damage the heart. Very slight changes in intrabronchial pressure give rise to very great changes in blood-pressure.

3. "Continuous intratracheal insufflation is not adapted for the after-treatment.

4. "In continuous intratracheal insufflation everything depends at present upon the one cannula and the patency of the trachea.

5. "As far as the patient is concerned, a differential-pressure system leaving mouth, throat and trachea unencumbered, appears preferable to one requiring intubation."

Of the other varieties of apparatus with a simple face-mask, e.g., those of Robinson, Mayer, Brat, Danis, Schmieden, Lotheisen, and Tiegel, the last-named has found the greatest popularity in Germany. It is constructed as follows:—

1. A thin metal mask with an air-inflated face-piece. The latter is attached to the face by a readily adjustable band, so as to be air-tight.

2. A rubber air-balloon covered by netting and connected with the mask by a wide tube.

3. A cylinder of compressed oxygen attached to the air-balloon by a stout tube.

4. A water valve connected with the upper part of the mask by a thin metal tube, which allows for the escape of any excess of pressure, together with the gases of expiration.

5. Extension joints at various parts of the apparatus allow it to be adapted to the different positions of the patient.

6. The anæsthetic is either introduced into the air-balloon, which can be replenished without interrupting the positive pressure, or it is administered by an attached Roth-Drager's apparatus.

These dangerous appliances (if I may be allowed the expression) are the alternatives of Brauer's positive-pressure and Sauerbruch's negative-pressure apparatus. Both of the latter ensure a quiet and regular differential pressure.

Brauer's apparatus consists of:—

1. The mechanism for the generation, conduction, and regulation of the compressed air.

2. The head-cabinet, with an arrangement by which the head of the patient and the hands of the anæsthetist are passed into its interior.

3. An attachment of a Roth-Drager and oxygen anæsthetic apparatus. The maintenance of the constant pressure throughout the whole head-cabinet, which contains about 150 litres, is carried out by a motor or hand engine, and it can be regulated by means of an outlet valve. A modified blast engine drives about 600 to 800 litres of compressed air through the system per minute. The whole of the patient's head, with

the exception of the face, is enveloped in an air-tight covering, the lower end of which is attached to the opening in the cabinet ; similarly the hands of the anæsthetist are thrust through rubber gloves, the arms of which are fastened to openings in the walls of the cabinet. The pressure of the air in the cabinet keeps the head-envelope and the gloves in air-tight apposition to the head and arms, and so maintains constant pressure.

This apparatus has the advantage over the old Sauerbruch chamber of greater portability. Further, without any special appliance, it can be used in any large room, and it can be worked by hand. It allows free intercourse between operator and anæsthetist.

Disadvantages of the apparatus are the difficulty of narcosis because of the fixed position of the anæsthetist's hands, and its relatively difficult use for operations in the upper part of the thorax. The pressure prevailing in the head-cabinet drives the envelope covering the head downwards, and thus covers the front and side of the upper portion of the thorax. In this way the operator's hand is directly pressed upon, and perfect asepsis made impossible. Lastly, any change of position of the patient is extremely difficult with Brauer's apparatus, because of the difficulty of moving the head in the cabinet.

These disadvantages do not exist in the new Sauerbruch chamber, which allows direct and easy communication between operator and anæsthetist. This new model is made in two forms. The construction of the one is founded upon that which W. Meyer has used in practice. A metal frame which can be easily moved and put together makes its ground-work. The walls, which can be easily fitted to the frame, are of the lightest and thinnest possible material (cane-fibre). The cabinet has no floor, but the lower end of its four walls is provided with a broad rubber flange, so that they can be attached to any flat floor surface by an air-tight joint. The shape of the wall by the head is so arranged by a bulging of its sides that the operator is not interfered with. The middle part of the same wall bears a slit for the ring encircling the head which can easily be moved upwards and downwards. The head is put through the ring, and the remaining part of the opening can then be closed by a mechanical device. Interference with the operator by bulging of the head mask is done away with. The head-piece itself can easily be moved upwards and downwards by a simple handle, so that in any position of the patient his head can be placed high or low. Above the head is a window, through which the anæsthetist can see the operation and the operator. The chamber is quite roomy, and ample ventilation is provided. Of special importance is the artificial illumination, because in operations in the depths of the thorax we are in great difficulty if obliged to work in the dark. This difficulty is overcome by electric lamps so placed that every hole and corner can be abundantly illuminated, rendering portable lights unnecessary. This latest model is easily moved and readily used, provided that a smooth floor is available.

The second type is specially constructed for bloodless operations

upon the cranium, and need not be considered in connection with thoracic surgery ; the price of the chamber is relatively small. The best apparatus hitherto constructed is that of Willy Meyer. In this, a large and a small chamber constructed on the same principle can be used in one of two ways, either as a positive- or a negative-pressure apparatus.

The latest efforts towards improving these methods lie in the direction of converting the operation theatre itself into a pneumatic chamber. Friedrich has occupied himself in working out this problem. Any room of a hospital, according to his suggestions, may be converted into a pneumatic chamber. By oil- or enamel-paint on the walls, covering the floor with linoleum, and the window and door cracks with fine asbestos or strips of rubber, the walls, floor, window, and door are made sufficiently air-tight. The head of the patient must be taken through the door, so as to be outside the area of reduced pressure, and in this way the room at any time can be used as a pneumatic chamber. The cost of this alteration and the apparatus for exhausting the air is reckoned by Sauerbruch at about £50.

In general terms, it may be said that there are but little physiological or practical differences between the positive- and negative-pressure methods. Both involve a slightly increased work for the right side of the heart. The negative-pressure is superior to the other, only in two conditions, namely, in tense pneumothorax, with mediastinal emphysema, and in the extirpation of parts of the lung. Its advantages in pneumothorax and mediastinal emphysema are readily understood, and would be expected *à priori*. In extirpation of whole lobes of the lung, practical experience has shown (Sauerbruch, Robinson, Meltzer), that the obliteration of the cavity occurs quickly by the use of negative pressure. With positive pressure, after removal of the lung, a cavity remains in the pleura which offers a direct hindrance to the falling together of the chest wall, mediastinum, opposite lung, and diaphragm. The larger the cavity left and the more slowly it is obliterated, so much the greater is the amount of the immediate exudation and the danger of its secondary infection. Apart from these rare special conditions, positive- and negative-pressure methods are to be regarded as of equal value. We agree with Küttner in saying that the choice of apparatus is a matter of taste. Concerning the apparatus with the simple mask, a final opinion cannot yet be expressed.

Dangers of the Differential Pressure.—As has already been remarked, every differential pressure involves an increased strain on the right ventricle. A relatively small increase in the difference of the pressure produces a somewhat considerable increase in the blood-pressure of the pulmonary circulation. If the pressure-difference is large, the cardiac muscle may be overstrained, with consequent acute dilatation of the right ventricle. Such a result has been observed frequently by Sauerbruch in animal experiments when working with a pressure-difference of 25 to 30 mm. Hg. The greatest difference of pressure used in thoracic operations in the human subject, namely, 10 to 12 mm.

Hg, has not produced this result. It is particularly important not to employ a pressure difference greater than 4 to 5 mm. Hg when the right side of the heart is weak, and especially in conditions of emphysema.

The danger of dilatation of the stomach, which has been observed by Sauerbruch in animals under great differential pressure, practically does not exist under the conditions used in human surgery. Sauerbruch has only once seen this phenomenon: in a patient from whom a large part of the chest wall had been removed on account of a tumour. The cause of dilatation of the stomach is the increased air-pressure in the mouth and pharynx over that in the abdomen. Such a condition might be fatal by pressing the diaphragm upwards, whereby breathing is embarrassed and the heart's action hindered. By means of high differential pressure the lung can be so much distended as to become caught in the opening of the thoracic wall.

The General Technique of the Method.—The essential condition for the performance of every intrathoracic operation is an extremely perfect asepsis. The poor resistance of the pleura to infection is well known.

A temperature of at least 25° C. (77° F.) should prevail in the operating-theatre, because patients with pulmonary disease are more susceptible to cold than others. The position of the patient requires special attention. The general principle that he must be placed in the position most convenient to the operator often needs to be modified in the case of those with bronchiectasis, abscess of the lung, or large tuberculous cavity. Such patients must be laid upon the diseased side, to prevent the aspiration of fluid into the sound lung. Friedrich has designed a special operating-table for such cases; it consists, as it were, only of one long half of a table, whilst the other half has only the parts which support the shoulder and pelvis. In this way the side of the thoracic wall remains entirely free. In cases with copious secretion, the patient is placed with the head low to facilitate its outflow. The trunk must be well elevated in conditions of marked dyspnœa.

Either general or local anæsthesia is used, or a combination of the two. In addition to its use for small operations, local anæsthesia is specially useful for patients with copious purulent secretion in the lungs. Patients can then relieve themselves by coughing, and the danger of aspiration of the septic fluid is prevented. It is fortunate in this connection that the lung-tissue itself is not sensitive, and also that the blood-vessels can be handled and ligatured without pain, as according to Friedrich they are without vasomotor nerves. In extensive pleural operations a general anæsthetic is necessary. This, in combination with morphia, is the best way of abolishing the so-called pleural reflex, which is brought about by stimulation of the vagus fibres and is liable to occur in the neighbourhood of the hilus of the lung and the œsophagus. It results in slowing of the respiration and heart-movement and, in severe cases, cessation of the heart and death.

In the choice of anæsthetic the various indications and contra-indications of chloroform and ether must be borne in mind. Complete anæsthesia under differential-pressure operations can be carried out with remarkably small doses, and seldom if ever leads to vomiting. This is probably due to the increased pulmonary pressure causing the anæsthetic to be more rapidly absorbed into the blood, and also to the relative anæmia of the brain. The cerebral anæmia is probably due to the low conditions of pressure prevailing over the body wall and the lower extremities. It is always advisable for the anæsthetist to have an assistant. The differential pressure is established when the soft parts have been divided down to the intercostal muscles. The costal pleura is opened under a pressure of not more than 3 to 5 mm. Hg. An injury to the lung is liable to occur if the pressure is any higher. A sufficient view of the interior of the thorax is obtained by retracting the ribs bordering upon the incision by means of suitable retractors, special instruments having been designed by v. Mikulicz and Sauerbruch. The parts not visible can easily be explored by the hand. The pressure must be raised to 7 to 9 mm. Hg during this palpation. In all manipulations upon the lung itself it is better to reduce the pressure again to 5 to 6 mm. Hg. Operations upon the œsophagus, or upon the great vessels running behind the lungs require only the minimum of 3 mm. Hg.

If the lungs are but little distended, these operations may have to be followed by gauze plugging. At the end of the operation the closure of the thoracic wound is undertaken with slightly raised pressure. A few stout pericostal or percostal sutures draw the neighbouring ribs together; continuous muscle suture ensures the airtight closure, and the skin is stitched by interrupted or continuous suture. If gauze drainage has been necessary, the pressure-difference is maintained until the conclusion of the dressing, which is rendered airtight by a rubber sheet. Drainage of the pleural cavity involves a serious complication. On this account Rehn and Wolf avoid primary pleural drainage, and prefer to risk the necessity of re-opening the chest if infection occurs.

At the conclusion of the operation, a sudden cessation of the respiration is liable to take place, particularly if the face-mask apparatus has been used. Under these circumstances artificial respiration must be carried out. In the after-treatment a cautious use of morphia is indicated. The patient should be able to cough and breathe without pain, but should not sleep heavily.

Special Thoracic Surgery.—Although successful operations had been previously done from time to time inside the thorax without differential pressure, these new appliances have introduced a notable advance. The most extensive resection of the chest wall, with opening of the pleural cavity, has lost a great part of its difficulty and danger by the prevention of pneumothorax. A favourable post-operative recovery is thereby to a large extent ensured. The plastic closure of large defects in the chest wall can be carried out under ideal conditions.

The soft parts laterally mobilized are sewn together over the distended lung in two layers, so as to be air-tight. The lung itself is not included in the suture or in the thoracic wound. If it is necessary to remove a piece of the lung, the pulmonary wound is closed by a primary suture. A satisfactory method for suture of the lung has been employed by Garré, Talke, Tiegel, and Friedrich. In aseptic operations, the lungs and flaps heal without difficulty; only the lessened respiratory movements bear witness hereafter to the magnitude of the operation. Such operations have already frequently been carried out with good results.

In female patients—and these are in the majority—Sauerbruch recommends that the breast of the sound side should be brought over as a wide flap to cover the defect in the chest wall.

Differential pressure affords valuable assistance to the operator in the case of Freund's operation for emphysema, and in that of resection of the chest wall for unilateral phthisis such as has been carried out by Brauer many times successfully. The formation of a large flap of soft parts is necessitated by Schede's thoracoplastic operation, and in doing this it is very easy to perforate the tough pleura; this accident is of comparatively little moment when working under the differential pressure. Before the adoption of thoracoplasty for pulmonary disease, an artificial pneumothorax used to be formed in order to set the affected lung at rest and so facilitate healing. Brauer, Spengler, and Forlanini have published wonderfully good results. Those cases where there is a co-existing laryngeal tuberculosis are very favourably influenced by the creation of an artificial pneumothorax. The results obtained at Forlanini's clinic are at any rate so encouraging that further efforts in this direction should be made. The proceeding is without danger if the technique advised by Brauer is strictly adhered to. For these details the original paper must be consulted.

Included in the scope of resection of the thoracic wall must be mentioned the operation of cardiolysis. This has been carried out by Brauer for cases of adhesive mediastino-pericarditis. The final result of this proceeding is still open to doubt. According to Romberg, the purely cardiac type of pericarditis must be distinguished from that which is a part of polyserositis, the latter being unsuited for operation.

The favour with which the differential-pressure methods are regarded in the treatment of pleural empyema is steadily increasing. The majority who have thus employed the method are much impressed by the greater rapidity with which the lung expands, thus causing quicker recovery.

Our own experience is that the new method is suitable in conjunction with suction appliances and syphon drainage. The change of dressing must of course always be made under differential pressure. For this purpose Tiegel's mask is a most valuable addition to our resources.

American authors speak highly of the treatment of old cases of empyema by the injection of Beck's bismuth paste.

Wounds of the lungs, on account of hæmorrhage and pneumothorax, require that the chest should be opened. They can easily be discovered with the help of the differential pressure. Garré, Bramann, and others have shewn how very difficult it is to locate a wound in a collapsed lung. With the differential pressure, the stream of air flowing out from the wound leads to its ready detection. As the collection of blood and mucus in the bronchi is also sucked outwards, the danger of these being aspirated is abolished. After a careful suture of the lung, the wound in the chest wall may be closed without drainage or packing. One direct result of the introduction of the differential-pressure method will be to more and more replace the expectant by the active treatment of lung wounds. In the case of traumatic pneumothorax and emphysema, the advantage of the negative pressure is that it quickly sucks the air out of the subcutaneous and mediastinal tissues.

Pulmonary injuries may also lead to the tearing of a main bronchus. As the contusion of the thorax is generally most severe in a sagittal direction, the rupture of the left bronchus has been most frequently observed. Simultaneous rupture of the lung is rare, and death would in this case rapidly follow. Some cases, however, live long enough to allow of surgical intervention. Tiegel advises that in such a case the injured lung should be preserved and its function retained by a careful suture of the main bronchus. He regards the removal of the injured lobe of the lung as undesirable, because it would be almost impossible then to deal with the central bronchus. In dogs Tiegel has often sutured the bronchi successfully, but in the human subject he thinks that this would be much more difficult. On the basis of post-mortem experiments he recommends an incision in the second intercostal space. Further details of the technique are given in the original paper (*Beitr. z. klin. Chir.* 1910).

In the extirpation of tumours of the lung, extraction of foreign bodies from the bronchi, and in removal of entire lobes of the lung, the employment of differential pressure is indispensable. The affected portion of the lung is rendered bloodless by a temporary ligature of the vessels at the hilus. By means of Friedrich's hilus forceps it is possible to compress the great vessels without occluding the bronchus. The stump of the bronchus left after extirpation of the pulmonary lobe is best treated, according to Willy Meyer, in the same way as is used with the base of the appendix. Abscesses and gangrenous cavities of the lung can be treated without any differential pressure. They are opened in one or two stages according to the presence or absence of pleural adhesions. The importance of the correct position of the patient for these operations has already been referred to. The location of the abscess cavity is facilitated by the use of the two-stage operation. It is then advisable to adopt the differential pressure before emptying its purulent contents.

The new method has rendered good service in treating wounds of the great pulmonary vessels, as v. Eiselberg and Küttner have succeeded in suturing the pulmonary vein in the negative-pressure chamber. On the other hand, Trendelenburg's operation for the removal of pulmonary embolus is extrapleural, but if the pleura should be accidentally wounded, the differential pressure will be of utility. Sauerbruch and Bruns have observed that the ligature of a large branch of the pulmonary artery in animals is followed by shrinking of the corresponding lobe of the lung, with great subsequent connective-tissue proliferation ; but, so far, this observation has not had any practical result.

The technique of cardiac surgery has entered upon quite a new phase since the introduction of the differential-pressure method. Formerly, in exposure of the heart the greatest possible care had to be taken to avoid opening the pleura, because of the serious danger of operative pneumothorax. According to the combined observations of Fischer, Loisson, and Hacker, 80 per cent of the wounds of the heart are complicated by injury of the left pleura, but they were operated upon without the formation of the smallest degree of pneumothorax. In the after-treatment, an infected pneumothorax is as dangerous as an infected pericardium, so that the avoïdance of post-operative pneumothorax is the salient point in cardiac surgery, and there is no more certain way of ensuring this than by the use of differential pressure.

Formerly, the method of heart exposure avoided the pleura ; but Sauerbruch and Hacker, after many observations, recommend that under differential pressure the heart is most rapidly laid bare by a free intercostal incision, such as has already been used with success by Wilms. The bleeding from the cardiac wound which tends to prevent air entering the thorax will be quickly fatal to the heart itself. Sauerbruch and Hacker have found that the best pressure to use when suturing the heart is 3 mm. Hg. With this pressure, the heart is sufficiently accessible, its wall is relaxed, and the bleeding is not so severe as it is with fully distended lungs. The bleeding is purely systolic. The first suture is used as an anchor. When the cardiac stitching, which should only involve the epi- and myo-cardium, and avoid the endocardium, has been completed, the chest wall is closed under somewhat higher pressure (7 to 8 mm. Hg). The pleura is closely sutured and the pericardium drained.

Up to the present, the only clinical results in cardiac surgery have been in the treatment of traumatic injuries. Our present technique would justify the exposure of the heart for the extraction of foreign bodies. Any operations more extensive than those just indicated have given so high a mortality in animal experiments, that their employment in human surgery is excluded.

The application of a ligature to an aortic aneurysm has been several times attempted, but without exception the patients have died. Aortic suture has been carried out by Fiori. In dogs, the experiments of Sauerbruch and Hacker have been followed by those of Carrel, and

both suture and resection of parts of the aorta performed with success. In the ascending portion, and the arch, Carrel's method of suture is exceptionally difficult, because the stitches cut out. The possibilities in the case of the descending aorta are more favourable. If we contrast the condition of the aortic wall of animals, uninjured by alcohol, tobacco, or other toxins, with that of the aneurysmal vessels of human beings, we must admit that the prospects of successful suture of the latter are not very hopeful.

For the exposure of the anterior mediastinum (for the removal of tumours) Friedrich has shortly suggested a new method, the transverse mediastinotomy. The sternum is divided in the second interspace close to the third costal cartilage. The upper and lower parts are then forcibly separated, together with the attached ribs. If necessary, the incision can be extended into the intercostal space, but if possible the pleura is not divided. This proceeding gives a good view of the anterior mediastinum and its contents, but it has not yet been tried on the living subject.

Killiani has carried out the removal of an impermeable stricture of the œsophagus by the trans-thoracic route, but his patient died within twenty-four hours from severe pulmonary congestion. The hope that the thoracic part of the gullet might be rendered amenable to the removal of malignant growths by the employment of differential pressure methods, has unfortunately not been realized. On this subject Sauerbruch, who has done the most work thereon, says, "Only the carcinoma lying at the cardiac end of the œsophagus presents the conditions favourable for resection, for in this the invagination method can be employed. A growth not higher than 6 cm. from the stomach presents relatively favourable conditions, but in any other situation the disease is well-nigh inoperable." The technique of the method is described in the papers by Sauerbruch, Mendel, and Tiegel. Experiences so far give some encouragement.

The operability of a growth at the cardiac end of the gullet can be ascertained by an exploratory thoracotomy, which must often be combined with a laparotomy. Sauerbruch strongly recommends the more frequent use of this exploratory thoracotomy. He designates it as the best method by which we can increase our knowledge of the operability of intrathoracic disease. With absolute asepsis, it is no more dangerous than an exploratory laparotomy. When we consider of what great value the latter has been in the abdomen, we are led to hope that the analogous proceeding may do much for the surgery of the thorax.

THYROID GLAND, DISEASES OF. *Priestley Leech, M.D., F.R.C.S.*

Charles H. Mayo,[1] of Rochester, says that the earlier cases of hyperthyroidism, and cases presenting irregular symptoms, were not classified; they were simply "pseudo" or "fruste" until they corresponded to those described by Graves or Basedow in the description of the disease as a finished product. The thyroid gland itself

received less attention from the pathologists than the heart or nervous symptoms; and the treatment, being symptomatic, was changed from time to time as new remedies were added to therapeutics. The early surgical experience in Basedow's disease was unfortunate in the high mortality due to delayed surgery, complications, and degenerations of essential organs, which often prevented a cure. Most of the operations were a last resort after failure of other treatment.

His experience with ligation of vessels in this disease covers some 200 cases. Ligation of the vessels in those suffering from mild symptoms of hyperthyroidism, in those in whom the diagnosis is made early, possibly before the appearance of the less important eye symptoms, or even goitre, will often produce a cure in a few weeks. Ligation is also indicated in that larger group of acute, severe exophthalmic goitres, and in the chronic and very sick patients who, having exhausted all forms of treatment, are suffering from various secondary symptoms—dilatation and degeneration of the heart, fatty liver, soft spleen, diseased kidneys which have resulted from the chronic toxins, as seen in the later stages of Graves' disease—changes which, after all, are the final cause of death. This operation is of particular value in those cases with a marked pulsation and peculiar thrill of the superior thyroid arteries. All severe cases of hyperthyroidism, when suffering from œdema, ascites, dilatation of the heart, diarrhœa, or gastric crisis of vomiting, should be under observation for a short time at least, and some of them for a considerable period, to improve their condition if possible before a ligation is attempted. Some cases, with rest, *x*-rays, etc., so improve as to become operable, and in these cases ligation as a preliminary procedure is of great value.

He considers ether in an open mask the best anæsthetic; sometimes he uses local anæsthesia. A hypodermic injection of $\frac{1}{6}$ gr. of morphia with $\frac{1}{100}$ gr. of atropine is given thirty minutes before general anæsthesia is commenced. The more restless, nervous, and hysterical patients do well with scopolamine-morphia $\frac{1}{200}$ to $\frac{1}{150}$ gr. one hour preceding the operation with local anæsthesia. A transverse incision crossing the central part of the thyroid cartilage is the best. The inner border of the sternomastoid is retracted laterally, the omohyoid is exposed and drawn upwards and inwards, and beneath this muscle is the upper pole of the gland with the superior thyroid artery and vein, which are both included in the ligature. The vessels must be ligated at the pole of the gland, for if this is done nearer the carotid, anastomosis may take place between the large inner branch and the inferior thyroid. In the severe cases, rest in bed and saline slowly by the rectum; if subject to diarrhœa, give saline subcutaneously. Scopolamine $\frac{1}{200}$ to $\frac{1}{150}$ gr. to control great muscular restlessness, and injections of strophanthin and digitalis with caution, Camphorated oil is a useful stimulant 10 to 15 mins. hypodermically, as is an ice-bag over the precordial region. In severe cases the danger after operation continues for several days. After ligation, progress towards

recovery is not so quick as where a definite quanity of gland tissue can be removed. In the large hard glands of hyperthyroidism, where some reversion has occurred, with colloid deposit, ligation is not indicated.

In the majority of cases the ligation is made as a definite step in a graduated operation to reduce excessive secretion of the gland, and some of the reported cases are yet to be operated on for removal of part of the gland as a secondary procedure.

REFERENCE.—[1]*Ann. Surg.* Dec. 1909.

TIC DOULOUREUX. (*See* NERVOUS SYSTEM, SURGERY OF.)

TINNITUS AURIUM. (*See* EAR, DISEASES OF.)

TOE-NAIL, INGROWING. *Priestley Leech, M.D., F.R.C.S.*

Van Meter[1] describes a very simple operation for the relief of this condition. After the usual cleansing operations, and a thorough application of Harrington's solution, under local anæsthesia a diamond-shaped incision is made in the lateral aspect of the toe (*Fig. 72*). The upper lateral angle of this incision should come to within not less than

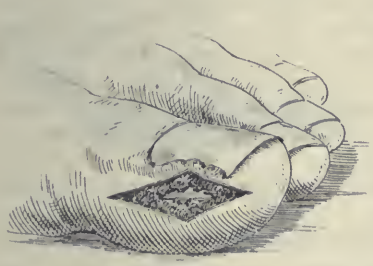

Fig. 72.

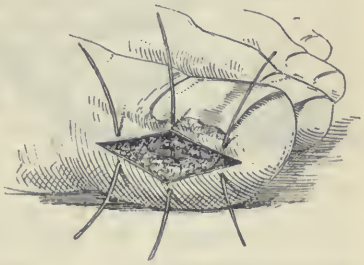

Fig. 73.

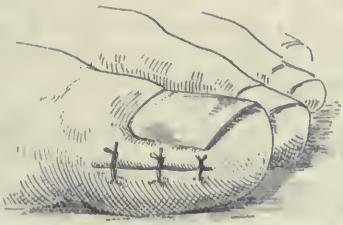

Fig. 74.

Figs. 72-74.—Van Meter's operation. Diamond incision in lateral aspect of the toe.

¼ inch of the border of the nail, care being taken to leave sufficient room in the healthy tissue for the insertion of a suture. The incision is carried down to the periosteum, and a diamond-shaped piece of tissue excised. Three fine sutures, preferably of fine silkworm gut, are used to close the wound; the middle one being placed so as to

coapt the lateral angles of the wound. This draws the overlapping exuberant granulation tissue away from the nail as shown in *Fig.* 74.

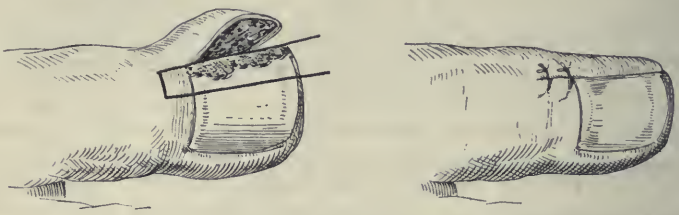

Fig. 75.—Anger's operation.

At times, in order to expedite this, it is advisable to make a nick near the root of the nail. No portion of the nail is removed; it

Fig. 76.—Cotting's operation.

is not mutilating; the convalescence is short, and the end result most satisfactory.

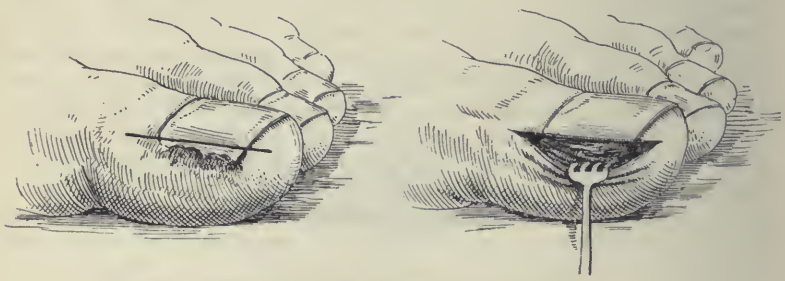

Fig. 77.—Von Bergmann's operation.

Anger's, Cotting's, and von Bergmann's operations are also shown in figures 75 to 77, in order to illustrate the greater simplicity of van Meter's operation.

REFERENCE.—[1]*Ann. Surg.* Nov. 1909.

TONSILS, DISEASES OF. *W. Milligan, M.D.*
D. Lindley Sewell, M.B.

Richards[1] publishes a paper compiled on the answers he received to a series of questions addressed to a hundred and thirty laryngologists asking their opinion on the physiology of the tonsil, its relation to tuberculosis and enlarged cervical glands, and to rheumatism, the use of chemical caustics in its treatment, the indications for removal and the choice of method, the question of hæmorrhage, and the result of removal to the voice.

All knowledge, obtained so far, seems to show that the function of the tonsils is normally one of defence against infection; it is, however, prone to become pathogenic and of more danger than safety to the owner. "The pits of the tonsils are retorts in which the germs are either destroyed, or modified so that they may live at peace with their host, or they are allowed to pass through in such numbers as can be dealt with by internal processes without the destruction of the host. From various clinical facts, it seems likely that it is the small, sunken, ragged tonsil, and not the large tonsil, which gives entrance to the dangerous germ." The lining membrane of the crypts does not form a complete unbroken barrier to organisms, and indeed it would seem that the tonsillar tissue is the most vulnerable spot in the throat. The lymphatic drainage of the faucial tonsil runs directly to the upper deep cervical glands, the tonsillar gland being situate just behind the posterior belly of the digastric muscle where this crosses the sterno-mastoid, and located just below and behind the angle of the jaw. In tuberculous adenitis of the neck this is invariably the first gland to become enlarged. There is no relationship between the size of the tonsil and the involvement of the glands; indeed, infection probably occurs more readily through the small submerged tonsil. Although not definitely established, there appears to be little doubt as to the positive connection between rheumatism and tonsillar disease.

In cases where operative treatment is not permitted, the use of **Silver Nitrate, Chromic Acid,** or **Trichloracetic Acid** applied on a right-angled wool-carrier and passed deeply into the crypts, is of value in reducing the size of the tonsil and adding to the comfort of the patient. The indications for the removal of the tonsil are: recurring tonsillar abscess, or quinsy, recurrent simple tonsillitis, benign tumours and new growths of any kind when their removal is not prejudicial to life, diseased crypts coexisting with tonsillitis and rheumatism, mouth-breathing due to hypertrophy of the tonsils, middle-ear inflammation apparently due to enlarged tonsils, impaired nutrition and general toxæmia when of tonsillar origin.

In the matter of tonsillotomy and tonsillectomy, the answers show a marked and growing predilection for the latter operation; still such observers as Chiari, Shurley, and Gleitsmann prefer the former. General anæsthesia is preferable to local, and the best medium is ether. The majority of authorities operate with the patient in the prone position; Richards himself, however, has the patient sitting

up in a chair. In the performance of the operation he prefers the use of the finger-nail to the numerous types of knives and directors that have been invented for the purpose, and finally removes the thoroughly freed tonsil with a Mathieu's guillotine which has had the forks removed. According to most observers there is rather less hæmorrhage after tonsillectomy than after tonsillotomy, while post-operative hæmorrhage would seem to be caused by injury to the muscular bundles in the anterior and posterior pillars, and to the superior constrictor of the pharynx.

Evidence would seem to show that the internal administration of **Calcium Chloride** or **Calcium Lactate** for three or four days before operation is of value in preventing bleeding. The voice is improved rather than injured by tonsillectomy, provided the pillars of the fauces are not injured, and that no stumps of tonsillar tissue are left.

John P. Dougherty[2] describes a little device (*Fig.* 78) which may be of interest to those who remove the tonsil by means of the finger-nail, or to those who avoid the finger-nail method solely from fear of the resultant trauma. It is in principle merely a very strong finger-nail, which can be made as sharp as desired and freely modified as to shape and length. A simple way of making it is to take an ordinary thimble of a size which loosely fits the middle finger, and which is, therefore, very loose for the index-finger on which it is to be used. A hole is filed in the top of the thimble and is enlarged until, with the exception of a lateral projection about the size and shape of a finger-nail, about half the thimble has been cut away. This projection, both at its tip and at its base, should be rather narrower than the finger-nail, and should not include any part of the top of the thimble, as this might interfere with the tactile capacity of the index-finger when thrust into and partly through the instrument. If the instrument be made but slightly

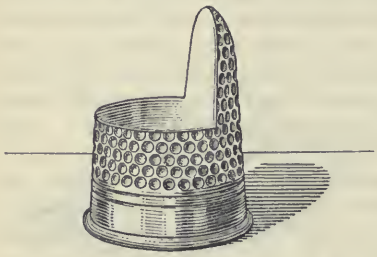

Fig. 78.—A simple tonsillotome.

Fig. 79.—Hubbard's tonsil harpoon.

sharper than the finger-nail, the tonsil can be removed neatly, quickly, and without trauma, and at the same time the danger of cutting adjacent structures is largely obviated. A narrow piece of gauze or tape must be threaded through the instrument to facilitate its recovery in case it slips from the finger.

In other than the tonsillar region it may also prove a useful adjuvant to finger-nail dissection, and in some cases may be used in place of a scalpel or scissors.

Hubbard[3] describes an instrument called a "tonsil harpoon"

Fig. 80.—Tenaculum for tonsillotomy.

(*Fig.* 79), which he uses to draw the tonsil from its bed in the operation of enucleation of the tonsil. It consists of a handle, octagonally shaped and tapering to a fine hollow rod, and the stylet joining the

Fig. 81.—Layman's tonsil knife, with guard and retractor.

harpoon and handle by a fine screw, the thin adjacent ends dove-tailing for added strength. At the curved portion the instrument is flattened and slightly broadened, greatly increasing its self-retaining power. The curve of the instrument is accurately measured, so that the point of the instrument easily emerges into the patient's pharynx. In using the instrument the tonsil is first pulled out by a tenaculum (*Fig.* 80); the harpoon point is then directed downwards and inwards towards the median line of the throat. When the tonsil is transfixed, the instrument is withdrawn, when its blades spread to their utmost capacity and permit the surgeon to raise the tonsil from its bed.

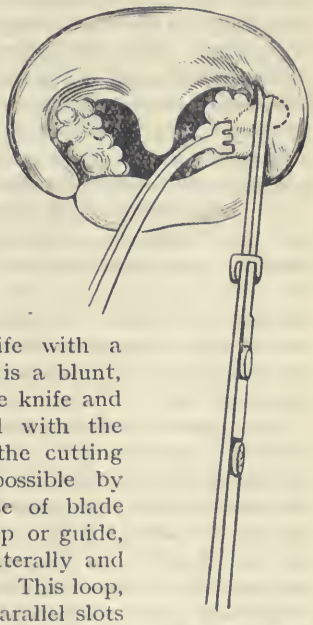

Fig 82.—Layman's tonsil knife.

Layman[4] describes a new tonsil knife with a guard and retractor attachment, which is a blunt, flattened tool adjusted to the side of the knife and having a lengthwise movement parallel with the knife, and also a limited movement in the cutting plane. Such movements are made possible by adjusting to a tonsil knife, between base of blade and beginning of handle, an oblong loop or guide, whose, plane is at right angles, both laterally and transversely, to the length of the knife. This loop, with the shank of the knife, forms two parallel slots through which is passed the retractor, the shank of which may work through the right or left slot as the operator may place it. The retractor's lengthwise action is controlled by a set-screw. The writer thinks the knife is best adapted for the enucleation of tonsils in the sitting posture.

The instrument shown in *Fig.* 83 has been invented by W. W. Carter[5] for the purpose of holding a soft friable tonsil while it is being liberated from its pillars and while the snare or tonsillotome is being adjusted. It consists of two specially curved prongs, flattened on the upper surface, each making the half-turn of a screw; these are mounted on a long slender shaft. It can be instantly engaged or disengaged by a half turn in either direction, and the snare or tonsillotome may be used with the tenaculum in situ.

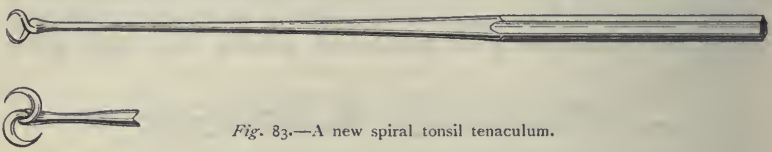

Fig. 83.—A new spiral tonsil tenaculum.

Carmichael[6] reports the results of his examination of the tonsils removed in a series of fifty cases. All of them showed glandular enlargement in varying degree. In seven, undoubted evidence of a tuberculous lesion was found in the tonsils; in two, the glandular enlargement was only slight and the tonsils were small. In none of the cases was there anything in the appearance to suggest the presence of tubercle, although other observers have described tuberculous ulcers on the tonsil. The question arises as to whether the tuberculous lesion is to be regarded as primary or secondary; in five of the cases the lungs were sound, in two there were slight dullness and increase of vocal resonance at the apex of one lung, but no sign of active disease and no evidence of tubercle could be found anywhere else in the body.

A consideration of the microscopic appearances would seem to show that the infection is a direct one from the mouth, since the tuberculous changes, giant-cell systems, and fibroid changes are situated around the bottom and sides of the crypts, the remainder of the tonsil being comparatively free. If this view is correct, and the glands are infected secondarily, then the practice of removing the enlarged glands in the neck and leaving the original focus (the tonsil) unattacked, must be unsound.

In a paper on "Some Practical Points in the Surgery of the Tonsil," Milligan[7] contends that the tonsils should be regarded as important portals of systemic and glandular infection, and when diseased should be treated on the same principles governing the treatment of lymphatic glands in general. The faucial tonsil is developed in the dorsal portion of the second pair of visceral pouches of the pharynx, and appears during the fourth month of fœtal life. In health the tonsils are about one-half of an inch in length, width, and thickness. About twelve to fifteen openings on the surface lead into crypts, which run right through the substance of the tonsil and terminate on the fibrous capsule which separates the organ from the superior constrictor of the pharynx. The crypts are of great clinical importance, as in them decomposing secretion and bacteria find a resting-place.

Lymphatics are abundant and arise around the follicles, pass into the deep cervical glands in the posterior triangle of the neck, then into the deep thoracic glands, and finally into the thoracic duct. The supra-tonsillar fossa lying above the tonsil and between the converging edges of the faucial pillars, is a favourite site for septic inflammation and for the lodgement of foreign bodies ; moreover, a large number of crypts open into it.

In an investigation carried out some years ago, the writer found that 15 per cent of tonsils and adenoids examined were tuberculous ; latent tuberculosis of the tonsil may not be dangerous unless pyogenic infection becomes superadded, when, indeed, generalized tuberculosis may result. It is important to note that it is not the *size* of the tonsils, but their *septicity* which is dangerous. The causal relationship between acute articular rheumatism and acute tonsillitis, recognized long ago, is now firmly established. Any angina which tends to cause swelling of the mucosa of the tonsil, closing the mouths of the tonsillar crypts and so leading to retention of secretion, epithelium, and bacteria, may cause destruction of the cryptic epithelium ; hence organisms may pass directly into the blood- and lymph-stream. Hypertrophied tonsils rarely have healthy lacunæ.

In considering the question of the surgical treatment of enlarged tonsils, the important factors are " the condition of the cryptic epithelium, the tendency to recurrence of attacks of lacunar tonsillitis, and the presence of evidence of systemic or glandular infection." When one remembers that the crypts extend right down to the capsule, it is obvious that to slice off with a guillotine that portion only which projects beyond the faucial pillars, leaving one-third or more of tonsillar tissue with diseased crypts, is an unsurgical procedure. The operation of tonsillectomy aims at complete enucleation of the diseased tonsil, and consists in shelling out the tonsil after incision of its capsule.

The writer's method consists in defining and incising the capsule with a right-angled hook-shaped knife, inserted under cover of the anterior pillar and swept upwards and downwards the whole length of the tonsillar isthmus. This procedure is repeated along the limits of the posterior faucial pillar. For children and young adults, where the base of the gland is loosely attached to the underlying cellular tissue, a guillotine is used ; in adults, either the finger, a straight knife, or curved scissors is used for the final separation, and the success of the enucleation is judged by seeing the shining fibrous base of the excised organ. Tonsillectomy is accompanied by less hæmorrhage than tonsillotomy, for after the first incision through the capsule the operation is conducted in the line of cleavage between the tonsil and superior constrictor muscle, so that the severed vessels may retract into the substance of the muscle. The operation may be performed under local or general anæsthesia, although the writer's opinion is that more thorough work, with infinitely less discomfort and suffering on the part of the patient, is accomplished under chloroform or ether

anæsthesia. From statistics compiled by Packard, chloroform is proved to have been three times more dangerous than ether.

R. H. Gilpatrick[8] advises sutures of the faucial pillars in cases of severe hæmorrhage following tonsillectomy. The patient is placed in the Rose position, and the mouth opened to its full extent. A round-pointed and fish-hook-shaped needle is threaded with a silk thread 18 inches long. The tongue is depressed and the needle made to enter the posterior surface of the posterior pillar as low down as possible. The needle is then thrust through both pillars, and the free end of the suture, long enough to project beyond the incisor teeth, is twisted round the operator's index finger. A perforated shot is now slipped over the needle and tail of the suture, and the shot is grasped in the jaws of a needle-holder. While one hand holds the suture taut, the other forces the shot against the anterior faucial pillar, and then compresses it with the needle-holder so as to fix the thread firmly. The tail of the suture is now fixed between two convenient teeth, and the suturing continued throughout the length of both pillars. At the apex of the pillars another shot is introduced and compressed. Both ends of the suture are left long, and are attached to the teeth to prevent the possibility of the shot slipping into the larynx should the thread break or tear out.

F. R. Packard[9] records a fatality following the removal of enlarged tonsils and nasopharyngeal adenoids, probably from the existence of the "status lymphaticus."

REFERENCES.—[1]*Med. Rec.* Dec. 11, 1909; [2]*Jour. Amer. Med. Assoc.* June 11, 1910; [3]*N. Y. Med. Jour.* Nov. 20, 1909; [4]*Jour. Amer. Med. Assoc.* Nov. 27, 1909; [5]*Ibid.* Ap. 23, 1910; [6]*Proc. Roy. Soc. Med.* Nov. 1909; [7]*Med. Chron.* May, 1910; [8]*Bost. Med. and Surg. Jour.* July 21, 1910; [9]*Amer. Jour. Med. Sci.* Sept. 1910.

TRACHEOTOMY, TRANSVERSE. *Priestley Leech, M.D., F.R.C.S.*

Franck,[1] of Frankfort, recommends a transverse incision of the neck and trachea as being much preferable to the usual longitudinal incision. The cosmetic result is much better, and there is less sepsis and less bleeding. The technique is as follows: The skin over the cricoid cartilage is pinched up in a fold, and is transfixed by a scalpel, so that a transverse incision two inches in length is made. The head is bent back, and the lower margin of the wound gapes so that the parts are well exposed. The linea albicans colli is exposed, with the two median cervical veins on either side. The linea albicans is torn along the whole length of the wound, and blunt dissection separates the muscles as far as the isthmus of the thyroid; this latter is drawn down with the left finger, and a transverse incision made into the trachea immediately under the lower edge of the cricoid. The gaping tracheal wound can be enlarged with the knife-handle and the tracheotomy tube introduced. The skin wound is approximated by suture. No other instrument but the scalpel is needed.

REFERENCE.—[1]*Münch. med. Woch.* Feb. 8, 1910.

TRICHINOSIS. *Robt. Hutchison, M.D.*

Gilman Thompson,[1] from a study of fifty-two cases of sporadic trichinosis, considers that the diagnosis may be established from the following symptoms: (1) Acute onset, usually with vomiting and abdominal cramps. (2) A high grade of eosinophilia, invariably present; usually above 30 per cent, and frequently much higher—even above 80 per cent. (3) A high grade of temperature, often reaching 104° or more, and lasting, in lessening degree, for two to six weeks. (4) Puffiness of the eyelids and face, with pains in the eyes, occurring in one-fourth of the cases. (5) Dyspnœa and diaphragmatic breathing, occurring without cyanosis in about one-fourth of the cases. (6) The generalized muscle pains, cramps, soreness, and prostration, causing sometimes deceptive apparent immobility. (7) The sudden occurrence of symmetrical circumscribed corneal hæmorrhages in a patient whose blood-vessels are not degenerated, should give rise to a suspicion of trichinosis.

Albert[2] investigated an epidemic of trichinosis, due to eating boiled ham, with special reference to the occurrence of eosinophilia, and comes to the following conclusions:—(1) Trichinosis is, no doubt, of far more frequent occurrence than is usually supposed. Many cases are diagnosed as cases of typhoid fever, rheumatism, ptomaine poisoning, cholera morbus, etc., or considered as obscure conditions. (2) Trichinosis usually results from the eating of uncooked seasoned or smoked pork or sausage, but may be caused by boiled ham which has not been exposed to a sufficient temperature for long enough to kill all the parasites. (3) The diagnosis of trichinosis occurring in isolated cases is frequently a matter of difficulty, and often can be greatly assisted by means of an examination of the blood. (4) So far as known, there is no condition in which the percentage of eosinophiles in the blood reaches such a high number so constantly as in trichinosis. (5) Eosinophilia occurs in practically every case of trichina infection. A few cases have been reported in which there was no eosinophilia (Da Costa, Howard, Rosenburger). Some of these were cases of severe infection, and in others an examination was made too long after the time of acute symptoms to be certain whether eosinophilia was or was not present at some time. (6) The eosinophilia varies, ordinarily, from 10 to 60 per cent. The highest percentage so far reported is 86 (Kerr). (7) Eosinophilia makes its appearance with the beginning of the acute muscular symptoms, which represents about the seventh to twelfth day after infection. It is at its highest at the height of the acute muscular symptoms, which is, ordinarily, during the second or third week after infection. After this it gradually disappears, so that at the end of the second or third month there is usually no increase in the number of these cells. (8) The total leucocyte count is usually, but not invariably, increased in trichina infection. The number of neutrophiles is relatively, and sometimes absolutely, diminished during the period of eosinophilia.

References.—[1]*Amer. Jour. Med. Sci.* Aug. 1910; [2]*Ibid*

TROPHONEUROTIC ANÆMIA.

Soamin in (*page* 14).

TRYPANOSOMIASIS. *J. W. W. Stephens, M.D.*

A. R. Bagshawe[1] gives a full account of the present state of our knowledge regarding sleeping-sickness.

Transmission.—After the fly, *Glossina palpalis*, has ingested trypanosomes, there occurs a period of about twenty days when it is not infective, but after this period it becomes so. How long it continues to be infective (perhaps for life) is uncertain. The evidence in favour of other modes of transmission, e.g., coitus and certain culicines, is inconclusive.

Diagnosis.—Direct examination of wet blood-films gave a positive result in about 36 per cent of cases, and by centrifugalizing in 90 per cent.

Gland Puncture.—The cervical glands give the greatest number of positive results ; but there are certain cases where there are no enlarged glands, or they are too small to puncture ; these amounted in a certain series to 12 per cent. Hence a careful blood examination should by no means be omitted.

Lumbar Puncture.—Trypanosomes may be found in quite early cases without any symptoms.

Auto-agglutination of the Red Cells.—This is an important sign ; it may be doubted whether it is ever present in an African native without infection by *T. gambiense.*

Gland Palpation.—The difficulties in the use of this diagnostic method are : (1) In the early stages of trypanosomiasis the glands are not enlarged ; (2) Adenitis is due to other causes besides trypanosomiasis ; (3) In some cases the glands are not much, if at all, enlarged ; (4) In others the glands diminish again, especially if a single dose of atoxyl has been given.

Œdema.—This is considered by some authors to be at least as valuable as gland palpation.

Treatment.—(1) **Arsanilate** (atoxyl or soamin). It is best given hypodermically. The author goes so far as to say that if anybody has recovered under this treatment it is due to his resistance and not to the drug. The danger of blindness, and the fact that a prolonged course of the drug leads to a kind of super-sensitiveness on the part of the patient, should be borne in mind. (2) **Arsanilate and Orpiment** is largely used, but it is too early to speak as to its value. (3) **Arsanilate and Tartar Emetic.** This seems to be the best treatment at present. The arsanilate is injected under the skin once a week, and the antimony salt into a vein once or twice a week. Caffeine is said to prevent the very unpleasant effects of tartar emetic. (4) **Arsenophenylglycin.** Doses of 1 gram are well borne. It should be noted in the case of this drug, as in others, that the best results are got from a combination of two or more, as they act on different parts of the trypanosome. Whatever treatment be adopted, it is very necessary to use a generous diet.

Antimony Thioglycollate has also been employed (see *page* 9).

Prognosis.—It is doubtful if any patient has recovered if trypanosomes have been found by lumbar puncture.

P. Manson[2] considers that European women are more susceptible to infection than men, owing to the nature of their clothing; and recommends the use of some kind of Bloomer costume fastened round the boots, and loose sleeves fastened at the wrist.

E. D. W. Greig[3] describes the following procedure for recovering the trypanosome from the blood with certainty. Ten cc. of blood are drawn from the vein. A little sodium citrate (1 cc. of 1 per cent solution) is added to prevent coagulation. Centrifugalize for a short time. Pour off the clear fluid. Centrifugalize this fluid, which contains the trypanosomes, for ten minutes. Examine the sediment. By this method all cases of sleeping-sickness showed trypanosomes.

D. Bruce, A. E. Hamerton, and H. R. Bateman[4] give the results of an experiment on the mode of transmission of *T. gambiense* by *Glossina palpalis*. Kleine has shown that the phenomenon of late infectivity of the fly exists, that is, a fly becomes infective some twenty days after having fed. The authors conclude from their experiment that only one in sixty flies shows this phenomenon; that for every case which falls a victim to a late infected fly, a thousand must be infected by direct mechanical transference. [More recently this position has been abandoned by at least one of the authors.] An interesting observation was made, viz., that a minute drop of fluid taken from the gut of a fly (known to be infected) on the seventy-fifth day after feeding, gave rise to trypanosomiasis when inoculated into a monkey, with an incubation period of eight days.

R. Ross and D. Thomson[5] have shown, by counting the trypanosomes in stained thick films of measured amounts of blood, that there is a regular periodic increase of the parasites.

G. C. Low[6] suggests that there may be more than one species of human trypanosome. [In Feb., 1910, I observed in a case of sleeping-sickness a trypanosome which appeared to me to be different from *T. gambiense*, and reported the observation to the Advisory Committee of the Tropical Diseases Research Fund. In a paper by myself and Fantham[7] we have described this trypanosome, and have given our reasons for believing it to be a new human species, which we propose to call *T. rhodesiense*.—J. W. W. S.]

J. L. Todd[8] considers it almost certain that recovery may take place if the patient be energetically treated early in the infection with some appropriate trypanocide, and if at the same time every care be taken to support the general health. With regard to the diagnostic value of auto-agglutination of the red cells, it is held that it may occur without the disease being trypanosomiasis, but that it is almost constantly present in this disease.

The same writer[9] gives an account of the new human trypanosomiasis discovered by Chagas in South America. It is characterized by progressive emaciation, anæmia, and fever. Only in one child was the

trypanosome, *T. cruzi*, discovered. The trypanosome is transmitted by a species of bug (*Conorhinus magistus*), which comes out at night from the cracks in the walls of the houses. The trypanosome resembles other pathogenic trypanosomes, but is peculiar in that in the lungs (of guinea-pigs) it loses its locomotor apparatus, rounds up, and undergoes division (schizogony).

D. Bruce[10] states that the following propositions now hold good with regard to trypanosomiasis: (1) The trypanosomes of West African natives and those of Uganda are identical. (2) Trypanosome fever is the first stage of sleeping-sickness. (3) Neither the native nor the European is immune. (4) There is no absolute proof that a single person has recovered from sleeping-sickness. (5) It is more than probable that wild game will be found to act as a reservoir. (6) *Glossina palpalis* is the only carrier in nature. *Gl. morsitans* and *Gl. pallidipes* are under suspicion, but that is all. (7) Mechanical transmission takes place only if the flies are transferred instantaneously from the sick to the healthy (interrupted feeding). Normally, however, the trypanosomes multiply in the gut of *Gl. palpalis* when fed on infected blood (in about 5 per cent), and these then become infective thirty-four days later. (8) The most successful method of combating the disease is evacuation of the sleeping-sickness area.

REFERENCES.—[1]*Lancet*, Oct. 23, 1909; [2]*Brit. Med. Jour.* Jan. 8, 1910; [3]*Ind. Med. Gaz.* May, 1910; [4]*Jour. R.A.M.C.* Feb. 1910; [5]*Brit. Med. Jour.* June 25, 1910; [6]*Jour. Trop. Med.* July 15, 1910; [7]*Proc. Roy. Soc.* 1910 (Nov) B.561; [8]*Montr. Med. Jour.* Aug. 1910; [9]*Ibid.* Ap. 1910; [10]*Brit. Med. Jour.* Sept. 24, 1910.

TUBERCULOSIS. *Joseph J. Perkins, M.B., F.R.C.P.*

Many interesting cases are on record of the development of pulmonary tuberculosis after an injury, and recently the relationship between the two has been thoroughly considered by Parkes Weber.[1] Putting aside the instances in which the bacillus has been directly introduced at the time of injury, he divides the cases into two classes: (1) Those in which trauma is followed by signs of either acute disseminated miliary tuberculosis, or acute metastatic localized tuberculosis; (2) Those in which the pulmonary tuberculosis follows (or is first noticed after) an injury to the lung.

1. Instances of the injury which has led to miliary tuberculosis are the cases of men who received a blow on a tuberculous epididymis and on an old tuberculous ankle. More interesting and important than these cases of chance unavoidable accident are those in which operation or a movement of a diseased joint to break down adhesions has resulted in serious illness or death from the dissemination of the tubercle bacillus, which has gained access to the circulation during the operation. Cases of this kind are quoted, and it is evident that it is well to let things be in old bone or joint disease for fear of such a catastrophe.

2. This class is to be explained by the injury to the thorax damaging the lung, as evidenced by the hæmoptysis which follows, and setting free the bacillus, for which the lowered resistance of the bruised lung

provides a suitable nidus. In some of the cases there has been previous evidence of disease of the lung, but in others the sufferer has appeared quite healthy till the accident. When we remember the frequency with which limited quiescent foci of tubercle have been shown to exist in apparently healthy individuals, it is natural to suppose the pre-existence of such a focus as the site of origin of the pulmonary tuberculosis which follows the injury, rather than a fresh infection from without coincident with the accident.

Diagnosis.—Moro[2] holds that his method of the application of a tuberculin ointment to the skin is a truly specific test for tuberculosis, and that over a series of 388 cases in children it gave results almost identical with von Pirquet's cutaneous method, while having the advantage of being less distasteful to the public. The ointment has the composition of tuberculin (Koch's old) 5 cc. in anhydrous lanolin 5 grams. A small piece, the size of a pea, is rubbed into the skin (the site preferred by Moro himself being the upper part of the abdomen or the chest near the nipple) for about a minute with the finger. The spot should not exceed 5 cm. in diameter, and should be left uncovered for ten minutes until the ointment has dried ; no bandage is necessary. The typical reaction, which consists in the appearance of papules, commences at the end of twenty-four hours, and is at its height at the end of forty-eight hours, the most favourable time for inspection, especially as it occasionally happens that the papules do not come out till that date. Moro has published the results of the test in the cases of 1034 children.

Description of Cases	Number	Result Positive in
Manifest tuberculosis	96	79
Suspected „	450	330
Not suspected of tuberculosis ..	406	56
Scrofula	82	71

The failure of seventeen in the first group to react may possibly be explained, as in v. Pirquet's method, by the presence of such cases as miliary tuberculosis, late tuberculous meningitis, and cachectic phthisical cases in an advanced stage when hæmatogenous extension is progressing. Among forty-four cases which came to autopsy, were twenty-five in which no macroscopic evidence of tubercle was present, and it is noteworthy that in all these no reaction had followed the tuberculin inunction.

Von Pirquet's Skin Reaction.—McNeil[3] describes a modification of the technique of v. Pirquet's method which he has found to be of considerable value. He points out the importance of the removal of the tough barrier the epidermis presents between the capillary circulation and the outside, and the necessity of a technique which shall ensure contact of the toxin with the local circulation. To this end he chafes off the epidermis with the point of a surgical needle,

exposing a small circular patch of the pink cutis vera, bleeding or oozing being expressly avoided. On this vascular surface the tuberculin solution is placed and rubbed in by rotation with the head of the needle. He prefers this to v. Pirquet's method of boring the skin through the drop of tuberculin with a blunt object, such as the head of a knitting-needle, or Holt's scarification method, and certainly seems to have ground for his preference, for with his own technique he obtained a positive result in seven out of nine cases, as against two with v. Pirquet's, the cases being the same for each. For a positive reaction he accepted only a papule of a deep livid hue, which persisted for not less than a week.

He finds the test of great value in cases of enlarged glands, of obscure joint disease, and peritonitis. Of the pleural effusions, thirteen out of the fourteen tried gave a positive result, an interesting evidence of their tuberculous origin in childhood as in the adult.

In the severe or general infections, e.g., tuberculous meningitis, the test was unsuccessful, but it proved itself, which is much more to the point, a very delicate test in early conditions of tuberculosis where clinical evidence was wanting. As regards the respective merits of Calmette's and v. Pirquet's methods, the palm is given to the latter. Out of forty-seven cases, both were negative in thirty-one, and in none of these were the methods contradictory, but a positive v. Pirquet was obtained in ten of the remaining cases in which the ophthalmic test was negative. He concludes that the superiority lies in the more thorough application to the skin which is possible with a good technique.

J. W. Bride,[4] working at the Pendlebury Children's Hospital, has come to the conclusion that the test is of great value in (1) the early diagnosis of pulmonary tuberculosis and its distinction from unresolved pneumonia and chronic bronchitis; (2) the differential diagnosis between enteric fever and abdominal tuberculosis; (3) the diagnosis of the cause of pleural effusions.

Presence of Bacilli in the Blood.—Rosenberger's contention, reviewed in last year's *Annual*, that the tubercle bacillus could almost invariably be demonstrated in the blood of persons suffering from tuberculosis, making the procedure a valuable clinical test for the presence of the disease, has been subjected to still further careful enquiry at the hands of competent observers during the year, with results on the whole unfavourable to his view. A possible source of fallacy was pointed out last year by Brem, who found acid-fast bacilli abundant in some of the specimens of distilled water in his laboratory, which could easily be transferred to the blood-films in the process of baking. Rosenberger[5] has satisfied himself, however, that this source of error was non-existent in his own observations, and still maintains the accuracy of his views.

Burville Holmes,[6] who is hostile to Rosenberger's contention, states that, with the exception of two brief contributions on the subject, no confirmation of the theory can be found. He himself has studied the

question in the case of fifty patients, all sufferers from tuberculosis, at the Henry Phipps Institute at Philadelphia. In only one case of these were acid-fast bacilli found in the blood. Incubation experiments into guinea-pigs were made in thirty-seven of the fifty cases, and in no single instance was any macroscopic evidence of tubercle, glandular or otherwise, to be detected. His conclusion is that tubercle bacilli do not constantly circulate in the blood of tuberculous individuals, though they are occasionally present, as is shown by the inoculation experiments of Liebermeister.

Ravenel and Karl Smith[7] support this view, and believe that Rosenberger's method does not furnish a means for the diagnosis of tuberculosis, either in the early stages or later.

In this country Hewat and Sutherland[8] have come to the same conclusion. Making twenty-two examinations of the blood of twenty patients at the Royal Victoria Hospital for Consumption, Edinburgh, in one instance only did they find it possible to demonstrate acid-fast bacilli, and even in that case a second examination proved negative. They hold that at no stage of localized pulmonary tuberculosis is the bacillus demonstrable in the blood.

Bond Stow,[9] on the other hand, while failing to find acid-fast bacilli in the blood of ten incipient cases whose sputa contained tubercle bacilli, demonstrated their presence in the blood of six advanced cases of the disease out of eighteen examined, though they were absent from the other twelve. Examining the heart blood in twelve cases at autopsy, he discovered acid-alcohol-fast bacilli in two, plentiful in number in one, sparse in the other. He is therefore unable to assent to Rosenberger's view that tuberculosis in all its forms is a bacteriæmia.

Foster[10] holds a middle view: he allows that acid alcohol-resisting bacilli are present in the blood of a large percentage of tuberculous subjects, due to a more or less constant accidental invasion of the blood from foci of the disease. He thinks it probable, from the usual failure of inoculation and cultural tests, that these bacilli are not very virulent, and he would confine the term bacteriæmia in tuberculosis to the cases of the acute miliary type. The difficulties of Rosenberger's method are sufficient, in his view, to militate against its practical application.

Tubercle Bacilli in the Fæces.—R. W. Philip and Agnes E. Porter[11] state that the presence of tubercle bacilli is more constant in the stools than in the sputa, and that not in the case of persons suffering from tuberculous enteritis. Probably the bacilli enter the blood-stream, and are carried to the intestinal wall, whence they are excreted. The method adopted is as follows: a small piece of fæces about half a cubic inch in size is taken, and to this some 20 cc. of "antiformin" (a mixture of alkali hypochlorite and alkali hydrate to distinguish the acid-fast bacteria which are resistant to it) is added; the other bacteria and organic matter are speedily dissolved, the bacilli being gathered into a separate layer of sedimentation, a drop of which is taken for

examination. The authors have found 15 to 20 per cent the most suitable strength of the "antiformin," the time during which its action is allowed to continue not being of great importance, most of the efficacy being exerted in the first hour. Slides of the sediment are prepared and stained in the ordinary way, but careful search is required, the bacilli being usually very sparse.

In all, 109 specimens were examined: 99 from patients suffering from pulmonary tuberculosis—none of whom, however, had intestinal tuberculosis—1 from tuberculous peritonitis, while the remaining 9 were free from suspicion of tuberculous infection. Only 34 of these had sputa in which tubercle bacilli had been discovered: in the sputa of 42 no tubercle bacilli were found, and 24 had no sputa whatsoever. Of the 100 tuberculous cases, 79 were found to yield tubercle bacilli; only 21 were negative, and none of the nine normal subjects was positive. Of the 42 cases in which the examination of the sputa was negative, examination of the fæces was positive in 29, and of the 24 cases without sputa, 17. This method evidently is an important addition to our means of diagnosis, and that in cases entirely free from any suspicion of intestinal tuberculosis.

Treatment.—The use of **Tuberculin** in treatment is still the subject of continued investigation, and many papers have appeared during the year giving the various observers' experiences. On the whole, it may be said that there is a growing body of opinion in its favour, though there is still much difference of opinion as to the cases best suited to this treatment, the dosage, etc.

E. R. Baldwin,[12] reproducing the experience of the Saranac Sanatorium, would confine the use of tuberculin to patients in a fairly quiescent stage of the disease; the general condition must be good, and there must be freedom from persistent fever over 100°, hæmoptysis, night-sweats, diarrhœa, and extensive laryngeal disease. The physical signs in the lungs must be those of localized disease, with no wide dissemination or progressive change. Reactions in the case of pulmonary disease are to be studiously avoided. He prefers solutions to emulsions, owing to the uncertain absorption of the latter; but there appears on the whole to be little difference, in the opinion of most writers, in the value of the various preparations in use. Baldwin further holds that the dosage at present is empirical, and must be carefully determined from dose to dose in each individual case, the safest guide being the clinical condition of the patient. Subcutaneous injection is the only satisfactory method.

R. W. Philip,[13] who has used tuberculin since its first introduction in 1890, gives a decisive verdict in its favour. According to him, pronounced reactions are to be avoided, but mild reactions make for improvement, one of the most striking evidences of the good effect being a reduction of the symptoms of systemic intoxication, evidenced by an increasing sense of well-being on the part of the patient, with which the changes in the lesions, where superficial and visible, correspond. In advanced and active cases, where the system is already

flooded with toxins, tuberculin is only harmful, though even in the unhopeful cases striking symptomatic improvement is to be noticed from time to time.

Von Ruck,[14] from his experience at the Winyah Sanatorium, is able to speak of vastly better results, and those more permanent and from shorter periods of treatment, since specific treatment was introduced there. Excepting this addition, nothing has been changed in the methods at the sanatorium, and the cases admitted for treatment have been of the same class. Tabulating the results, he finds that: (1) In 782 cases treated from 1888 to 1908 without specific remedies, there were: apparently cured, 90, or 11·9 per cent; improved, 238, or 30·5 per cent; stationary or progressive, 454, or 57·6 per cent. (2) In 723 cases, which, in addition to the usual methods, were treated with tuberculin or some of its modifications, the product being derived from the culture fluid upon which tubercle bacilli had been grown to maturity, there were: apparently cured, 266, or 36·8 per cent; improved, 310, or 42·8 per cent; stationary or progressive, 147, or 20·4 per cent. (3) In 1503 cases treated with the watery extract of tubercle bacilli, the culture fluid not entering into the preparation, there were: apparently cured, 834, or 55·5 per cent; improved, 508, or 33·8 per cent; stationary or progressive, 161, or 10·7 per cent. These comparative results speak for themselves.

While such results can be obtained under the constant supervision of sanatorium life, it is interesting to ask how far they can be reproduced, and whether, indeed, tuberculin can safely be used, in the conditions of ordinary practice. A valuable paper by J. A. Miller,[15] on "Tuberculin Treatment in Office and Dispensary Practice," supplies the answer, and shows that there are no insurmountable obstacles to its use where supervision must necessarily be less close, and that the results—and in this he is confirmed by many observers—are most encouraging. The method Miller has followed has been the increasing dose by hypodermic administration, starting with an amount easily tolerated, and proceeding over a long period to large doses, but always avoiding the production of any marked constitutional reaction. Though febrile cases may be treated with advantage under strict supervision, this is impossible in most instances in ordinary practice, he believes, and he would therefore confine the use of tuberculin in those circumstances to patients in good condition and with no rise in temperature. Incipient cases, of course, do better than others, but these he has usually sent to sanatoria, and his experience is largely based on those who have fallen into a state of chronic invalidism with slow progression of the disease; even in them he has achieved strikingly favourable results. In many instances they have been able to resume their occupations. At the same time none of the ordinary precautions — rest, good air, and good food — has been neglected. Though rest was largely insisted on in the earlier stages of the treatment, exercise was increasingly allowed, and not a few of Miller's patients worked during the greater part of their course. Any excep-

tional exertion was prohibited for twenty-four hours after each injection, but absolute rest at such times is not essential.

The injections have been given as a rule twice weekly until large doses were reached, when the intervals were lengthened, the patient recording his temperature and pulse three times daily, and being warned of the symptoms of reaction for which to watch. Though patients often do well on fairly large doses rapidly increased, the safer method under conditions such as are being described is to start with a small dose, e.g., ·0001 mgram, or even less, with a gradual small increase. Severe reactions are much less likely to occur, and with the larger doses, unless skilfully employed, intolerance to tuberculin may result. Even the slighter evidences of intolerance, short of a marked febrile reaction, malaise, loss of appetite, headache, and loss of weight are to be carefully watched for, taken into account, and met. The appearance of local pain, redness, or swelling, is an excellent guide to the approach to the limit of tolerance.

Very little beneficial effect is to be noticed before two or three months of treatment, and no permanent results under six months at least. A return of symptoms will necessitate a second course. The chief evidence of benefit is to be found in the loss of toxic symptoms, the power to return to normal methods of living, and the permanence of the improvement. Bacilli tend, it may be said, to disappear from the sputa, but no great change in the physical signs in the lungs is to be expected. Figures, under such conditions of treatment, are not of much value, but the results claimed by Miller have been obtained by other reliable observers in both hemispheres. In Miller's own experience he draws special attention to the fact that 87 per cent of the patients were advanced or far advanced cases, and yet 51 per cent were apparently cured or arrested. The patients reported in his statistics were treated over a period of five years; yet at the present time 58·5 per cent are known to be well, and 40 per cent, having finished their treatment, are now leading active lives.

Warren Crowe[16] suggests the alternate use of human and bovine tuberculin in the treatment of acute phthisis, as he finds that a prolonged reaction from the use of either can be cut short by a dose of the other, "provided there has been developed some degree of hypersensitiveness to the form of tuberculin which excites the reaction." Steadily increasing doses of T.R. (starting with ·00001 mgram) are given every seven or ten days until a definite febrile reaction is produced, which is allowed to continue for some time: a dose of bovine tuberculin, half that of the exciting dose of T.R., is then administered, and it will be found that the temperature falls in a day or two at latest and the patient's condition is improved. After a fortnight's rest the dose of bovine tuberculin is repeated and increased gradually until a febrile reaction is again induced; a dose of T.R. is then administered, with the effect of cutting short the bovine reaction. Great improvement in the patient's general condition is the result, and in some instances, a marked improvement in the physical signs in the lungs.

Hemsted[17] reports an instance of surprising improvement, in the case of a boy suffering from disseminated tuberculosis, from the use of **Marmorek's Serum.** Tuberculosis of the kidney and bladder, tuberculous peritonitis, and tuberculosis of the lungs were all present. The temperature was 103°, the patient was delirious, with meningeal symptoms, and the whole condition seemed hopeless. Forty injections, each of 5 cc. of Marmorek's new serum, were made in the course of seven or eight weeks, during which time the patient slowly but surely improved, the diarrhœa ceasing, blood disappearing from the urine, and the crepitations and rhonchi gradually subsiding from the lungs.

O. Simon[18] reports his results in the treatment of forty-two cases at the Lipp Springe Sanatorium by **Spengler's J.K. Method.** It must be premised, in judging the results, that the stay of patients at this sanatorium is not longer than from six to eight weeks. The forty-two were classified into eight first stage, fourteen second stage, and twenty third stage, according to the Turban-Gerhard scheme. In the first-stage cases, a great improvement in weight and general condition resulted, though in most the state of the lungs did not materially alter. The results in the second-stage cases were comparable to those of the first stage, the average increase in weight being twenty-two pounds. The improvement in the third-stage cases was not nearly so marked, being negative in three, insignificant in three, satisfactory in seven, and good or very good in seven. In no case did the bacilli disappear from the expectoration, and the mean increase in weight was eight pounds. In the severe cases the treatment was without good effect. Unfavourable symptoms, however, were few, but in three cases the injections had to be discontinued, in two because their use was associated with rise of temperature, and either deterioration in the general condition or an increase in the signs in the lungs. In one case hæmoptysis occurred, but was not considered to have any connection with the treatment.

Holding the view that tuberculosis is a bacteriæmia, and that Lustgarten's bacillus of syphilis is no other than the *Bacillus tuberculosus*, B. L. Wright[19] since 1908 has attempted the cure of tuberculosis by **Injections of Mercury,** and apparently with good result. In these results he is confirmed by Penrose,[20] who makes the interesting point that after a mercurial course the tolerance of the patient to tuberculin is largely increased, on an average three- or four-fold. Wright follows the method of deep muscular injection into the buttock. He starts with $\frac{1}{15}$ gr. of succinnimide of mercury given every other day, and slowly increases the dose until slight tenderness of the gums or diarrhœa is produced. The dose is then somewhat diminished until these symptoms disappear. After thirty injections have been given, a rest of two weeks is allowed, and a second course of thirty injections, starting with the dose last employed, is carried out, when another period of two weeks' rest is observed. In this way the injections are carried on for a year, and then, after an interval of two or three months, resumed should the patient's condition make it necessary. The good results

claimed are a fall in temperature, an increase in general well-being, and a decrease in cough and in the number of tubercle bacilli in the sputa. With too large a dose of mercury the temperature will rise, cough and expectoration increase, and gastric disturbance appear.

Squire and Kilpatrick (*Medical Annual* 1910, p. 660), testing the method in this country in thirteen cases, noted improvement in all but four, and especially remarked the rapidity with which the physical signs decreased.

J. E. Gordon[21] speaks highly of the action of **Cryogenine** in pyrexial phthisis, and has frequently found it successful where other better-known antipyretics had failed. Compared with pyramidon, for example, the fall of temperature induced is less—two degrees as contrasted with three, four, or more degrees—but the result is more lasting and the tendency to collapse less. Five grains is a suitable initial dose for an adult, and eight grains should never be exceeded. Such a dose can be given twice daily, at noon, and four p.m., to intercept the evening rise, and can be continued without ill effects for a fortnight or three weeks.

H. R. M. Landis and H. J. Hartz[22] advocate the use of **Oil of Cloves** in those advanced or moderately advanced cases of pulmonary tuberculosis in which cavity formation has occurred and leads to severe paroxysms of coughing with excessive expectoration. Such cases are greatly benefited by the drug, but where the cough was unproductive and the amount of sputum small, no relief was observed. In suitable cases a marked diminution in the quantity of sputa followed the use of oil of cloves. Given internally it is administered in doses of from three to five minims in milk or in capsule, or in the following mixture :—

℞	Ol. Caryoph.		Extr. Glycyrrh.	fl. ℥iss
	Syrup. Senegæ	āā ℥ij	Aq. dest.	ad ℥iij

A teaspoonful three times daily after meals.

It may also be given hypodermically once daily in the dose of five minims in pure olive oil. The internal administration may be continued for from ten days to three weeks. A slight burning sensation was noticed in the mouth and œsophagus after taking the drug, but this, with rare exceptions, lasted a few minutes only, and soon disappeared.

During the last four years David B. Lees[23] has treated all his cases of early pulmonary tuberculosis by **Antiseptic Inhalation,** the formula used being :—

℞	Acid. Carbol.	℥ij	Spt. Æth.	℥j
	Creosoti	℥ij	Spt. Chlorof.	℥ij
	Tinct. Iodi	℥j		

A Burney Yeo inhaler has been employed, and the inhalations have been kept up continuously day and night, meal times excepted.

Under this treatment cough is relieved and expectoration facilitated. At first, for at least a week, the patient is kept absolutely at rest under open-air conditions ; during the following week he is allowed to rise for an hour or two daily, but the continuous use of the inhaler is still insisted

on. When the temperature is normal, walking is allowed, the extent being gradually increased, while at the same time the use of the inhaler is gradually curtailed. An abundant diet is prescribed, a half-pint of milk, to which a dessertspoonful to a tablespoonful of malted milk is added, being taken four times daily, in addition to abundance of easily-digested nutritious food.

Thirty cases treated on these lines are reported, every one of which has shown marked improvement, twenty-two being considered as certainly cured.

It must be noted that such success is claimed for this treatment only in the early stages of the disease. At an advanced stage relief may be given by these means, but cure, of course, must not be expected.

[For further notes on treatment, see—Utility of **Blood Transfusion** in (*page* 21); **Carbenzyme Trypsin** in (*page* 23); **Pituitary Ext.** in (*page* 46); **Thymus Gland** in (*page* 55); **Trypsin** in (*page* 56); Pulmonary, **X-ray** diagnosis of (*page* 75); Tuberculous glands, **X-ray** treatment of (*page* 77).]

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TUBERCULOSIS OF EYE. (*See* EYE.)

TUBERCULOSIS OF KIDNEY. (*See* KIDNEY.)

TUBERCULOSIS OF LIP. (*See* LIP.)

TUBERCULOSIS, SURGICAL. *Priestley Leech, M.D., F.R.C.S.*

A good many articles have appeared on this subject, and there is no general consensus of opinion as to the value of the newer treatment with tuberculin, etc.

Nathan Raw[1] gave a lecture on "The Treatment of the Surgical Forms of Tuberculosis by Tuberculin;" his views are based on observations of over 4000 cases of pulmonary tuberculosis and over 1800 cases of so-called surgical tuberculosis, which have been under his care; he has also made over 2000 necropsies on tuberculous cases. His further work tends to confirm the theory which he enunciated in 1903, i.e., there are two great groups of tuberculosis in mankind, viz., the one due to infection by bovine tubercle and the other by the human type of bacillus:—

1. Bacilli of the typus humanus produce the following lesions: (*a*) Pulmonary tuberculosis; (*b*) Tuberculous laryngitis; (*c*) Secondary intestinal ulceration.

2. Bacilli of the typus bovinus produce: (*a*) Tuberculosis of the mesenteric glands and intestines; (*b*) Of the peritoneum; (*c*) Of the lymph glands; (*d*) Of the genito-urinary organs; (*e*) Lupus; (*f*) Acute miliary tuberculosis; and (*g*) Meningitis (often).

Methods of Infection.—The lungs may be infected in one of four ways: Direct inhalation of bacilli; downward infection from cervical lymph gland; upward infection from abdomen through diaphragm to bronchial glands and by the blood-stream as in acute miliary tuberculosis. It must also be remembered that the lungs may be seriously infected with bovine infection, either from the digestive tract or from lymph glands. His opinion is that human and bovine bacilli are different varieties of an originally common species, and that the human body may be attacked by both of them, but that bovine infections are almost always produced in the milk-drinking period. When pure milk can be supplied to children, he thinks the non-pulmonary forms of tuberculosis in children will disappear. It seems to be impossible to produce an immunity either in animals or the human body by repeated injections of the same form as that from which the patient is suffering.

In tuberculin we have a very certain and simple method of deciding whether or not a person is suffering from tuberculosis; Raw has abandoned Calmette's test, but says von Pirquet's is useful and reliable. A negative reaction is of great value in excluding tubercle altogether, but a positive reaction may take place in people who have received a mild infection of tubercle which causes no symptoms, such as caseating mesenteric glands or bronchial glands, or even undiscovered phthisis.

In treatment, he uses Koch's **Tuberculin R.** for all forms of tuberculosis except consumption, for which he uses a tuberculin prepared from bovine bacilli in the same way that Koch's Tuberculin R. is prepared from human bacilli.

Results of Treatment.—*Tuberculous Glands.*—In Raw's opinion, nearly all tuberculous glands in the neck are caused by absorption of bovine bacilli through the tonsils, fauces, or carious teeth, and in all cases a history of drinking cow's milk, sometimes in large quantities, has been obtained. If the glands are actively caseating and suppurating, tuberculin does no good, and even in some cases may do harm. The caseating glands should be incised and packed with thymol or iodoform, or excised *en masse*. Later, tuberculin may be given, together with the usual fresh-air treatment and cod-liver oil. He is averse to extensive dissections of the neck to clear out all tuberculous glands; caseating and suppurating glands should be excised or opened, but others should disappear after twelve or fifteen injections of tuberculin. He looks upon glands in the neck as the most favourable lesions for treatment with human tuberculin.

Tuberculosis of Uterus and Fallopian Tubes.—He has had good results in seventeen cases by removal of affected tubes, and subsequent treatment with tuberculin.

Genito-urinary Tuberculosis.—These cases seem to respond well to tuberculin. Out of twenty-six cases, fourteen seemed to receive lasting benefit. Tuberculous testes should not be removed unless suppuration is present, because they often remain useful organs after tuberculin treatment. Tuberculous ulcers of the bladder are often very intractable, and may require some surgical interference as well as tuberculin, but they sometimes heal without operation.

Tuberculous Meningitis.—In Raw's opinion, all cases of tuberculous meningitis, together with gross tuberculous deposits in the brain, are due to infection from milk. He has never seen a case which had been fed on its mother's milk; and what is more remarkable, out of 4000 cases of ordinary phthisis he has never seen one develop tuberculous meningitis in the course of their disease. He now treats every case with tuberculin.

Tuberculous Joints.—He is convinced, the less surgical interference in tuberculosis of the joints, the better the chance of recovery. If abscess is present, the pus may be aspirated repeatedly; but if possible, drainage should be carefully avoided; there should be absolute rest, fixation, with fresh air and injections of tuberculin. In cases of abscess in bone, always open and drain, as it is highly dangerous to leave it, lest general miliary tuberculosis should ensue.

Tuberculous Peritonitis.—Out of twenty-eight cases, nineteen have been discharged quite recovered, six were much better, and three died. If there is excess of fluid, open. He generally gives these cases twenty weekly injections of tuberculin, watching the effects very closely.

Tuberculous Abscesses and Sinuses.—The presence of a mixed infection is the unsatisfactory element in these cases. He now treats them with staphylococcic vaccines corresponding to the patient's own discharges, and then with tuberculin. Never give tuberculin where there is waxy disease.

Lupus.—He thinks this disease is always of bovine origin, and may be conveyed by infection from person to person. He has treated forty-four cases by tuberculin, with excellent results. He feels sure that extensive and radical operations for tuberculosis are not good, and in cases of psoas abscesses and spinal caries will often induce a blood-stream infection, followed by general miliary tuberculosis and death.

Hinder,[2] of Sydney, comes to nearly the same conclusions as regards surgical interference in tuberculosis. He believes in **Rest, Tuberculin, Bier's Congestive Treatment, Open-air Treatment** day and night, and plenty of **Milk**; and says the results are better than with too much active interference.

Sir William Bennett,[3] on the contrary, thinks that the good effects ascribed to tuberculin may be due to the fresh air and good food, especially in hospital patients. He puts the various stages of the development of a tuberculous gland as follows: (1) Traumatic or infective adenitis; (2) Invasion by tubercle bacilli; (3) Resolution, caseation, or suppuration; (4) Suppuration after caseation.

The treatment during the first stage is, in the absence of injury, to find the focus of infection; and in many cases this may be difficult, e.g., a small ulcer, or, as in one case quoted, a small piece of bone impacted in the fauces. If, after removal of any local cause, the gland continues to fluctuate in size, it is better by removal to prevent the infection of further glands. During the period of bacillary invasion, tuberculin, open air, food, and traditional drug treatment. As regards tuberculin, he has little doubt that the good effected by this method in glandular tuberculosis is largely confined to cases in the very early stages of the bacillary invasion. Once tubercle has assumed the form of definite gross deposits, the results of the use of tuberculin seem to be no better than from the older plan of fresh air and good food. A practical point in the diagnosis as to the state of the glands is the use of the *x*-rays: if caseation is in progress, the glands are resistant to *x*-rays; and if a shadow is shown, the glands are unlikely to be amenable to treatment by tuberculin. When a gland has become soft to the touch, the sooner it is removed the better, before its contents burst through the capsule and infect the surrounding tissues. In cases of persistent sinus after operation, the condition is due either to the disease not having been removed, or to the operation area having become infected by some micro-organism other than the tubercle bacillus. If the latter be present without any other organism, a course of tuberculin treatment will assist the cure, unless some gross lesion has been left undealt with. If other organisms are present, **Vaccine** treatment from a personal culture is indicated. **Bier's Suction** may also be used.

The treatment of tuberculous disease in joints formed one of the subjects of discussion at the British Medical Association Meeting in 1909.[4] Sir Wm. Macewen relied on injection of **Iodoform** emulsion in the early stages; fixation, rest, generous diet, and open air. In cases where the epiphysis of a joint is affected, the eradication of the focus should be considered, and means taken to prevent the synovial membrane becoming infected; if a cavity is left in the bone, it is filled with a mixture of iodoform and boracic acid 1—4; the iodoform used must be that in large scales and not the fine powder, as this latter is absorbed too quickly. He recommends the consideration of excision when articulating cartilage is shed, but it should be done before the capsule of the joint has become destroyed and the sheaths of the tendons are invaded. He recommends specially modified excisions, and says the inter-articular structures and the whole of the cut surfaces must be protected from auto-infection.

Jones, of Liverpool, in the discussion which followed, laid most stress on fresh air. Children do infinitely better lying out of doors in a slum than indoors in a mixed ward, even in the most sanitary of town hospitals. Complete rest to the joint and good food were necessary. As regards tuberculous abscesses, he is strongly convinced of the value of a conservative attitude towards them. It is a mistake to attach the clinical importance to a tuberculous abscess that we do to a

collection of pus. Leave them alone as long as possible; they are only urgent if infected from within or from without. His experience warrants him in saying that numbers of children die in all parts of England and Wales because we do not realize the many responsibilities involved in the routine opening of tuberculous abscesses. If there is evidence of fluid, and discomfort, pain, and temperature are present, and the patient is rapidly or steadily declining in condition, then the abscess may be suspected, attacked by incision, bone searched for, etc.; but great care must be taken not to infect the wound. A retro-pharyngeal abscess also needs opening, as does one of those rare cases, a collection in the posterior mediastinum. He does not operate for pressure paraplegia, because 97 per cent recover without. The discussion showed a tendency on the part of surgeons to operate less frequently than formerly, and an appreciation of the advantages of fresh air.

Young,[5] of Philadelphia, recommends the **Diagnostic Puncture** of tuberculous abscesses. By this means a bacteriological diagnosis of the pus can be made, and operative treatment directed according to the findings. The puncture should be made through sound skin at the most prominent part of the collection. A portion of the fluid withdrawn should be placed in a sterile test-tube, and some on one or more prepared slides for immediate clinical microscopic examinations. Strict antiseptic precautions must be taken, the syringe being boiled, and kept in alcohol until used. The microscopic examination should include the cell counting, as in the cyto-diagnosis employed in pleural effusion. Injection of guinea-pigs may be made in suitable cases, though often the reports are received too late. If the fluid is sterile, these abscesses and joints may be opened and sewn up again without drainage.

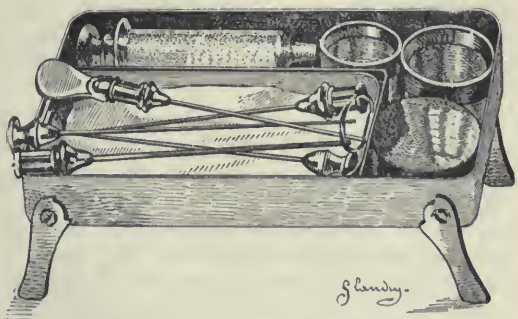


Fig. 84.—Tuberculous abscesses. The complete apparatus for aspiration.

Calvé and Gauvain[6] recommend from their experience the treatment of tuberculous abscesses of bone by conservative methods. At first, they advise simple aspiration of the abscesses, repeated if necessary; and if after several aspirations there is no sign of healing, they recommend the injection of modifying fluids. The technique of aspiration is as follows: It must be performed under as strict aseptic precautions as would be employed for any ordinary surgical operation. They use an all-glass syringe of 10 to 15 cc. capacity, with trocar, cannula, and blunt-pointed probe of exactly the same size as the trocar (*Fig.* 84). The probe is used for freeing the lumen of the cannula if it

becomes blocked by thick or caseous pus. The cannula should have no lateral opening, and should not be supplied with a tap. The length of the cannula should be at least 12 cm. ($4\frac{3}{4}$ in.), so that a deep abscess can be reached and plenty of healthy tissue traversed before the abscess cavity is opened; the calibre should not be too large: 1·8 to 2 mm. is the best. Sterile dressings, bowls, towels, and the sterile vessels containing the modifying fluids must be at hand. As a rule a general anæsthetic is not necessary. Ascertain the relation of organs near the cavity, as these may be displaced by the abscess. A local anæsthesia by ethyl chloride is all that is necessary. A screen is placed between the child's face and the seat of operation (*Plate XLIII*), and the patient is not brought into the theatre until everything is ready. The trocar should be inserted throug has thick a layer of healthy tissue as possible before the abscess cavity is entered. Preferably the highest point of the cavity should be penetrated, as aspiration into a dependent part is more likely to lead to the formation of a sinus. Two movements are required in the insertion of the trocar: a sharp one to penetrate the skin, and the second, more slow and methodical, to guide the point of the trocar into the abscess cavity, it often being possible to hold the abscess itself in the free left hand. The trocar is then withdrawn, and the pus escapes more or less easily into the sterile kidney bowl. When the flow ceases, the outer end of the syringe is fixed on the end of the cannula and more pus withdrawn. Aspiration must be gentle. Sometimes the opening of the cannula is blocked by caseous pus, and then its lumen can be cleared by the probe.

Removal of the cannula should be done with care. It is often advisable to aspirate with the syringe in removing the cannula, as the vacuum retains the fluid in the cannula, and prevents its escape into the track while it is being withdrawn. As soon as it is withdrawn, the track should be squeezed between the fingers, and after washing the puncture with alcohol, a dressing is applied. Occasionally a small amount of fluid escapes, but this is rare unless a large-calibred trocar is used. If the abscess fills (and as a rule three or four simple aspirations are needed to lead to a cure), the aspiration is repeated in exactly the same manner.

When, in spite of aspiration, the pus rapidly collects, where the abscess increases in size, where the surrounding tissues become more and more involved, the prognosis is much more serious; and more active treatment than simple aspiration is needed. In such cases the modifying liquids should be employed. Calvé and Gauvain use three: **Iodoform,** 5 to10 per cent in ethereal solution; idoform mixed with oil alone, or with oil combined with guaiacol and creosote. The combined mixture is: Iodoform 5 grams, ether 10 grams, guaiacol and creosote 2 grams each, and sterilized olive oil 100 cc. **Camphorated Naphthol:** In spite of the high favour this substance enjoys, they have abandoned its use entirely on account of its toxicity. **Camphorated Thymol** has the same action on caseous material as camphorated naphthol,

PLATE XLIII.

SURGICAL TUBERCULOSIS

Patient prepared for Aspiration. The screen hides the operator from the patient.

but is much less toxic. It is prepared by mixing 2 parts of camphor with 1 part thymol. The result is a syrupy liquid soluble in ether, alcohol, and chloroform, but insoluble in water. It makes an emulsion; and Ménard, for fear of capillary embolism, adds to this mixture an equal part of sulphuric ether, which dissolves the emulsified globules. It is advisable that the dose of the mixture of these three substances should not exceed 5 cc.; from 2 to 3 cc. are usually sufficient (33 to 50 mins).

In the use of iodoform in ether, certain precautions must be taken. Small doses alone must be used, 2 to 5 cc. at first, and not more than 10 cc. even in patients who bear iodoform well. The fluid must not be allowed to escape in liquid form from the cannula, as then the beneficial effect of the iodoform would be lost. The fluid is injected, and the piston is left at the bottom of the syringe. When the ether, acted upon by the warmth of the tissues, commences to evaporate, the piston is gradually pushed away. The syringe is then detached from the cannula, and the ether escapes, hissing; as soon as any liquid appears, the syringe is replaced and kept in position until further volatilization is indicated by the new ascent of the piston. Not until all ether appears to have volatilized, may the cannula be withdrawn, or if thought desirable, the injection started anew.

In an abscess containing caseous pus, the use of camphorated thymol is as a rule indicated, as this substance possesses a true liquefying action on the caseous masses. More constant and accentuated reactionary phenomena are provoked than with iodoform, and there may be general malaise with slight fever; but this general reaction is very rarely severe. Aspiration practised two days after the injection of camphorated thymol results in the withdrawal of a viscous liquid, which adheres to the wall of the syringe and is usually reddish-brown in colour. If the inflammatory reaction is too active, moist dressings to the part will restrict the inflammation during the period between the injection and the time when the material injected has accomplished its work in dissolving the caseous material and permitting its evacuation.

When the abscess increases rapidly in size, is extensive, the tissues around are being invaded and the general condition of the patient is unsatisfactory, probably there are defects in treatment as regards immobilization, hygiene, etc. If improved treatment does not lead to amelioration, the oily mixture of iodoform, ether, guaiacol, and creosote must be used. Simple aspiration will not answer, as in these cases the contents are often caseous; iodoform in ether is contra-indicated, because caseous material may block the cannula and lead to mechanical accidents; and camphorated thymol is too irritating, and may act on the primary lesion and so accelerate its evolution. Of course, in addition to this treatment, immobilization of joints and spine and general treatment (food, fresh air, etc.), must be employed.

Von Pirquet's Reaction.—In cases of suspected tuberculosis, this method is displacing the use of tuberculin by injection and Calmette's

ophthalmic reaction. Mills[7] has made use of it in 223 cases in children under twelve years of age. His technique is as follows: A small area of skin, conveniently on the arm, is sterilized, and a drop of a 20 per cent solution of Koch's old tuberculin is placed on it. The solution is usually in glycerin, and is kept in small capillary tubes like vaccination tubes. The skin is then gently scratched through this solution until a slight hyperæmia is produced. The capillary plexus should not be opened, but a drop of blood does not seem to interfere with the reaction. A control scratch is made through glycerin or normal saline, and a small dressing is applied for twenty-four hours. The common type of positive reaction is as follows: In twenty-four hours the scratch shows a slight hyperæmia and œdema, extending a little beyond the actual scratches of the needle. The control scratch should be invisible. In forty-eight hours the spot is redder, and is very definitely raised so as to be palpable to the finger, On the third day it has begun to fade, and on the fourth day it is usually gone. He tried the reaction in other forms of microbic infection (staphylococcal, streptococcal, and pneumococcal), using the corresponding vaccine in each case, but in no case was any diagnostic reaction obtainable. His conclusions are as follows: (1) Healthy children up to twelve years of age do not give von Pirquet's tuberculin reaction. (2) Tuberculous cases, with certain rare exceptions, do give this reaction. (3) The reaction has been of value in many doubtful cases. (4) The reaction may be repeated if desired, without being modified or altered by the previous use of the reaction. (5) A previous injection of tuberculin will not produce a reaction in a healthy patient. (6) An initial injection of tuberculin modifies the type of the reaction in a tuberculous case. The type returns to normal in about a week. (7) Bovine tuberculin behaves in an exactly similar manner to ordinary human tuberculin when used for the reaction. The reaction to bovine tuberculin is similarly modified in type by a subcutaneous injection of human tuberculin. Two cases of tuberculous peritonitis did not give any reaction.

The reaction may vary in type: it may be more marked than normal, or less marked than the maximum on the first day, and have almost disappeared on the second, so that it may be necessary to look for the reaction after eight or ten hours.

References.—[1]*Lancet*, Mar. 26, 1910; [2]*Austral. Med. Gaz.* Mar. 21, 1910; [3]*Pract.* June, 1910; [4]*Brit. Med. Jour.* Oct. 2, 1909; [5]*Amer. Jour. Med. Sci.* Aug. 1910; [6]*Lancet*, Mar. 5, 1910; [7]*Brit. Med. Jour.* May 14, 1910.

TUBERCULOUS MENINGITIS IN ADULTS.

Purves Stewart, M.D., F.R.C.P.

A number of interesting and important points are elucidated in a recent paper by Fischer,[1] who collected no fewer than 227 cases of tuberculous meningitis from the Leipsic Medical Clinic, in patients above the age of puberty. Most of these cases came to autopsy. In adolescents between the age of fourteen and twenty, three-quarters of

the cases were in female patients: a singularly high proportion, considering that only 33 per cent of the total series were of the female sex. Evidently the phase of sexual development in female patients increases the predisposition of the central nervous system to tuberculous infection. Whilst about 73 per cent of the cases occurred before the age of forty, yet the number of patients of middle and even of advanced age was considerable. Five cases were over seventy years of age, the oldest being seventy-eight. We must therefore be prepared to meet with this malady at any period of life.

The vast majority of cases were instances of basal meningitis, only about one-eighth being cortical in situation. A number of cases had co-existent tuberculous tumours in the cerebrum or cerebellum. The primary tuberculous focus, however, in most cases, was in the lungs and bronchial glands.

The symptomatology of tuberculous meningitis in adults differs in certain details from the clinical picture so familiar in children. Thus, vomiting and the hydrocephalic cry were relatively uncommon. The usual prodromal symptoms were headache and mental dullness. The symptoms developed gradually as a rule, only about 10 per cent having a sudden onset. In fully developed cases, the outstanding symptoms were headache, dullness, and drowsiness. Mental confusion was very frequent, and in about one-fourth of the cases there was delirium, mostly of an agitated type. Groaning and sobbing were very common, but the characteristic hydrocephalic cry was hardly ever noted. Trismus was frequent. The bowels were usually confined. A few instances of diarrhœa occurred, but this was usually due to intestinal tuberculosis. Vomiting, as already noted, was uncommon. But one symptom was strikingly frequent, and almost pathognomonic in its constancy: this was retention of urine; so much so, that in every case of phthisis in which this symptom appears, we should be highly suspicious of meningeal complications. Kernig's sign is less common in adults than in the infantile type. Convulsions and tonic or clonic spasms, especially of the face, occurred in about one-fifth of the cases. Ocular palsies were frequent. On the other hand, optic neuritis was uncommon, and still more infrequent were choroidal tubercles. Fever was almost invariably present: subnormal temperature was the exception. Remissions in the symptoms were occasionally noted, but not very often. It is interesting to note the various diseases for which adult tuberculous meningitis was mistaken. Amongst these may be mentioned senile dementia, enteric fever, apoplexy, and even myelitis.

Fischer has not himself seen a case of recovery from tuberculous meningitis, though he does not deny its possibility. He corroborates most of the modern physicians in recommending repeated **Lumbar Puncture** as the best palliative measure at our disposal. The relief afforded to the headache, delirium, and head retraction is sometimes most remarkable.

REFERENCE.—[1]*Münch. med. Woch.* May 17, 1910.

TUMOURS, MALIGNANT.

Carbenzyme Trypsin in (*page* 23); tumour of hypophysis, **X-ray** treatment of (*page* 80).

TYPHOID FEVER. *E. W. Goodall, M.D.*

Etiology.—The problem of the typhoid "carrier" still continues to be the subject of investigation by epidemiologists, medical officers of health, and bacteriologists, wherever the disease is at all prevalent, and a number of instances of the condition and its results has been reported since the last volume of the *Medical Annual* went to press. Inasmuch as in that volume a few typical instances were detailed at some length, and there is little, if anything, new and of importance to be recorded, so far as the history of outbreaks due to "carriers" is concerned, it would be a waste of space to record similar instances. The epidemiological aspect of the question has been admirably dealt with by Theodore Thomson, C.M.G.,[1] in his Presidential address to the Epidemiological Section of the Royal Society of Medicine. Thomson chiefly confines his attention to the two practical questions: What is the proportion of "carriers" in the community, and in what degree is the carrier a danger to those amongst whom he lives? In attempting to give a true answer to the first question, Thomson has to rely principally upon the published work of German investigators. After briefly alluding to the distinction drawn between "temporary" and "chronic" carriers, and after pointing out that re-examination has shown that some persons who have at one time been declared to be temporary, would later have to be put into the category of chronic, carriers, the author concludes that about 3 per cent of persons who are attacked by typhoid fever become chronic carriers, if the present methods of examination be regarded as sufficient; but if the bacteriological examination of the excreta of typhoid convalescents were to be more frequently made than is usually the case, a higher percentage would certainly be revealed.

In not a few instances a history of previous typhoid fever is lacking in some persons who are found to be carriers. Several observers have endeavoured to ascertain the proportion of carriers in any given population. The results of their enquiries, so far as they go, show that about 3 per cent of the population are in that condition. Thomson attacks the problem from a different point. He writes as follows: "Some degree of knowledge as to the extent to which the carrier condition is directly dependent on a previous attack of enteric fever may perhaps be looked for in an endeavour to ascertain whether any increase in the number of carriers takes place in a community which has recently suffered from a severe epidemic of enteric fever. If a material increase in the number of carriers in such a community takes place after an epidemic of the fever, it is to be expected, on the assumption that the carrier is a material danger to others, that there will be an appreciably greater amount of enteric fever in the community in years following the epidemic than in years preceding it."

He then discusses the well-known epidemics of Worthing, Maidstone, and Lincoln, and shows that there was no material increase in the disease in those towns in the years immediately subsequent to the epidemics; so that either there were few carriers created by the epidemics, or, if there were carriers resulting from them in any large number, they were not particularly harmful to the communities inhabiting the towns in question. On the basis of 3 per cent of those who were attacked by and recovered from typhoid fever, in each of the epidemics, there would have been 39 carriers in Worthing with a population of about 17,000, 57 in Maidstone with 33,000, and 30 in Lincoln with 52,000. [This would probably be an underestimate of the number; moreover, it takes no account of those carriers occurring amongst the persons who had not had typhoid.—E. W. G.].

The age-incidence of temporary carriers (those who carry the bacillus for less than three months) is similar to that of enteric fever; but the age-incidence of chronic carriers is widely different; very few of these are under fifteen years. As regards sex, while there is an excess of temporary carriers amongst females to about the same degree as there is an excess of typhoid fever in the same sex, there is a very notable excess of females over males amongst chronic carriers: about 83 per cent of the former to 17 of the latter. But women, from their household duties, are more likely to be detected as carriers than men.

Thomson calculates that if 3 per cent of the persons who go through an attack of typhoid fever and recover become chronic carriers, there are at the present time in Manchester some 2000, in London more than 14,000, and in the whole of England and Wales about 108,000 carriers.

In discussing the second of the two questions, that of the degree of danger a carrier is to the community, Thomson points out that observations go to show that the excretion of the bacilli by the patient is usually intermittent, so that a carrier is not continuously infective. This is shown by various examples. Here and there a particular carrier may be responsible for much mischief. The most noteworthy example is that of the Folkestone cowman whose case has recently been investigated by R. W. Johnstone. There is every reason to believe that to this man might be attributed 64 per cent of the cases of enteric fever that occurred in Folkestone during the period 1896–1909; the total number of cases during this time was 222. On the other hand, the history of Worthing, Maidstone, and Lincoln immediately following their epidemics, goes to show that, generally, the carrier is not very harmful; and "an argument of somewhat similar sort, tending to minimize the importance of the carrier as an infective agency, has been advanced by Linossier. He states that in 1909 nearly 100,000 persons visited Vichy, of whom, he estimates, about 10,000 were sufferers from gall-stone disease, who went there for treatment. In view of the recognized relationship between that disease and the carrier condition, many of these persons must have been carriers; and he states that the conditions of life during treatment at Vichy are eminently favourable to the transmission of infection.

Therefore, he says, the Vichy season should be the signal for an outbreak of enteric fever among the population there. Nothing of the kind, however, occurs, from which he infers that chronic carriers are not all equally dangerous, and that they are not a danger at all save in special circumstances."

Kayser, after investigating the cause of all the cases of typhoid fever—505—occurring in Strassburg during a period of nearly four years, came to the conclusion that only 9·5 per cent were directly due to carriers, while 19 per cent were due to contact with cases of the fever. This preponderance of instances of infection derived directly from contact with a patient over that derived from a carrier was found also by Frosch in the campaign against typhoid in South-West Germany; [and, it may be added, by Aldrige,[2] in the British troops in India; Lumsden,[3] in an epidemiological study of typhoid fever, stated that he regarded personal contact with patients as one of the major factors concerned in the transmission of typhoid fever infection in the district of Columbia. The moral one draws from a perusal of Thomson's address is that most probably the carrier is not responsible for very much of the prevalence of typhoid fever, and that there is no necessity to resort to harsh measures in dealing with the unfortunate carrier.—E. W. G.]

For an exhaustive account of all that is known on the subject of typhoid carriers up to the middle of 1910, the reader is referred to J. C. G. Ledingham's "Report to the Local Government Board on the Enteric Fever Carrier."[4] In the appendix is a full bibliography.

D. S. Davies, I. Walker Hall, E. Emrys-Roberts, and J. Fletcher[5] made certain examinations, extending over a period of fifteen months, in the case of a "carrier" with bacilli in the urine. They found that urotropin, 7½ gr. two or three times a day, limited the number of bacilli, but did not do away with them altogether. The effects of vaccine treatment were also observed, but this did not free the urine from bacilli, nor did a course of potassium citrate.

Gaehtgens[6] has investigated the opsonic index (as regards the *B. typhosus*) of a few typhoid-carrier cases. He first ascertained that the serum of normal persons gave an index of 0·8 to 1·2. The serum of twelve persons who had suffered from typhoid fever three months or more previously, but who were not carriers, showed mostly a normal index. In two cases it was 1·4 and 2·1; both of these persons had suffered from typhoid fever only three months previously. The serum of sixteen persons who were known to be carriers, and who had suffered from typhoid fever from six months to twenty-nine years previously, gave an index of 1·4 to 3·9. There is, therefore, evidence to show that the opsonic index of a typhoid carrier is above the normal.

A case of acute spermatocystitis in a youth of seventeen, and one of acute prostatitis in a man of twenty-eight, are recorded by Marchildon.[7] The lesions were discovered only at the autopsies. Typhoid bacilli were recovered from and demonstrated in the affected

organs. The cases are of interest as illustrating possible sources of chronic bacilluria after typhoid fever.

Tenney[8] has recently made bacteriological investigations as to the presence of typhoid bacilli in the sputum and saliva of persons suffering from typhoid fever. In all he examined fifty-three cases, several of which presented bronchial, but none laryngeal or pneumonic symptoms. In none was the bacillus found in the sputum or saliva.

The question of the treatment of typhoid carriers is dealt with in a series of articles by Cummins, Fawcus, and Kennedy.[9] Chronic carriers may be divided into four groups: (1) Pure intestinal cases: typhoid bacilli excreted only in the fæces. (2) Urinary cases: typhoid bacilli excreted only in the urine. (3) Intestinal cases with symptoms of inflammation of the gall-bladder: typhoid bacilli excreted in the fæces, but obviously having a focus in the gall-bladder. (4) Mixed intestinal and urinary cases: typhoid bacilli excreted in both urine and fæces. It was thought that the pure intestinal cases might be freed of bacilli by the aid of lactic-acid bacilli, and two carriers of this class were given by the mouth pure cultures of Bulgarian bacillus in diluted malt extract. Carriers of the other three groups were treated by acidifying the urine, intestinal antiseptics, and vaccines, but it cannot be said that any marked improvement *quâ* the presence of bacilli in the excreta was to be observed. So far, it is to be feared, a person who is "once a carrier" is very likely to be "always a carrier."

[The best advice as to the treatment of carriers appears to be: the carrier should not, if it can possibly be helped, be engaged in the handling of food which is to be partaken of by others; and he or she should be most careful to wash the hands thoroughly after the performance of the functions of excretion, and also before meals.—E. W. G.]

W. Forest Dutton (Pittsburg, U.S.A.),[10] discussing the capabilities of various insects in carrying the *B. typhosus* and infecting the healthy with them, writes of the pomace, a little fruit-fly (*Drosophila ampelophila*), that in Pittsburg, in September, 1908, he secured cultures from these flies found in a garbage-can into which excreta had been thrown, within a hundred feet of a restaurant where hundreds of people dined daily. Of the bed-bug (*Cimex lectularius*) he says: "I had observed among Poles, Italians, and Russians, in filthy quarters, where the beds had been used by typhoid patients, that succeeding occupants were stricken with typhoid. I had noted that, after being bitten with bed-bugs, in from eight to fifteen days they were attacked with typhoid. This disease-carrying factor was suggested to an Italian tenant of one of a number of typhoid-infected houses, with the advice that the beds be destroyed by fire and the house fumigated. The advice was refused. To test the case, the man offered himself for experiment. I collected some bed-bugs, starved them for several days, then placed them on the abdomen of his eight-year-old daughter who had typhoid, incarcerating them under a square piece of a fleece-lined undershirt, fastened at the edges with zinc-oxide adhesive plaster. In six hours

the bugs, satiated with blood, were imprisoned between soiled pieces of canvas and allowed to remain twenty-four hours. They were then transferred to the abdomen of the father, imprisoned in the same manner as on the child, and allowed to remain twelve hours. It was noted that only about one-third of the bugs had bitten the subject. After removal, the bugs were crushed between glass slides and cultures made. These cultures showed the Eberth bacilli. Unfortunately, a few of the bugs escaped, and fed on the blood of an eleven-year-old boy, with whom the subject was sleeping. The father developed typhoid of the most virulent type in fourteen days, and the boy in twelve days." Dutton also states that he obtained cultures of typhoid bacilli from 20 out of 500 human fleas which had been allowed to suck the blood of typhoid patients; and further, that he is fully convinced, as were his confrères, that two cases which came under his care were inoculated by house-fleas.

Diagnosis.—In discussing the diagnosis of typhoid fever, Ziegel[11] gives a short account of a disease which was first described by Brill in 1896. The following is Ziegel's description:—

"The most striking mark of differentiation is the *eruption*, which appears as a single crop, usually before the seventh day of the disease. There are no new crops. Appearing first on the abdomen and back, the rash spreads rapidly to the chest wall and extremities, is sometimes seen on the neck, palms and soles, and is often more profuse on the upper extremities than on the trunk. The rash is a profuse one, and sometimes a number of the lesions run together to form small patches. The spots are maculopapular in character, and usually have an oval, indistinct outline. On stretching the skin or making pressure over the spots, the latter fade somewhat, but do not disappear entirely. Sometimes hæmorrhagic spots are seen interspersed with the other lesions, and frequently there are present, in addition, suspicious but not typical roseolæ. The eruption fades rapidly at the time of defervescence, but its remains are seen for some days in the form of brownish stains.

"The febrile invasion is usually abrupt, and is ushered in with a chill or chilly sensations, followed by very severe headache and high fever. For a variable period previous to the invasion there is general malaise. The temperature curve reaches its acme in about three days, and then remains sustained till the time of crisis or rapid lysis. While the fever lasts the headache persists severe, and in a small proportion of cases there is also meningismus. Apathy and prostration develop very early, and the patient ill with Brill's disease looks as poisoned and as sick in the first week as does the typhoid patient in the second or third week.

"Just as distinctive as the eruption is the *prompt recovery of the patient at the time of defervescence.* After the temperature has remained continuously high for a period varying from one to two weeks, there is a fall to normal in from ten to sixty hours; thereafter, in the great majority of cases, the temperature never again rises above

normal. No case has been observed with a relapse or with serious sequelæ, and the mortality is nil. At the time of crisis or rapid lysis, the mental condition becomes bright, the headache disappears, and the patient says that he is entirely well. It is usually difficult and apparently unnecessary to keep the patient in bed for as long as a week after the temperature has fallen. Characteristic is this rapid convalescence to complete recovery."

Bacteriologically the disease is not due to the typhoid or the paratyphoid bacillus. These organisms are not to be recovered from the blood, nor are they agglutinated by the patient's serum. According to Brill,[12] quoted by Ziegel, the disease is rarely, if ever, fatal, nor is it communicable. A bibliography of the subject is appended to the paper.

[Ziegel discusses the diagnosis between this disease and typhus fever. To me the account given suggests typhus of a mild form; and further observations seem to be required before it can definitely be stated that "Brill's disease" is not typhus. A reference to Brill's own paper confirms this view. He writes, when discussing the diagnosis of the disease from typhus fever, as follows: "In the case of an epidemic of typhus, in my opinion, it would be simply impossible to say that these cases which I have described were not mild typhus fever." He appears to rely chiefly upon the non-epidemicity of the disease, its apparent want of infectiousness, and its mildness (there was not a fatal case amongst the 221 cases he has observed); the only clinical sign he notes as being different from typhus is the absence of the subcuticular mottling.

Brill's cases were admitted to the Mount Sinai Hospital during the years 1896 to 1909. It is curious that of his last fifty patients (the details of which he tabulates as exemplary of the whole 221) thirty were Russians and twelve Austrians. In the sporadic cases of typhus I have observed of recent years in London, most have been Russian Jews, who have not necessarily recently arrived in England. And, as regards the non-epidemicity and want of infectiousness, sporadic cases still occur in London which do not give rise to others even in what would seem to be the most favourable circumstances. But I admit that I have seen small groups of two or three cases in one family, and the disease may be fatal. Probably typhus in London is overlooked, because it is mild at present. I have twice found a case of the disease in a large general hospital in London, in which it was being treated as enteric. To me Brill's paper proves that typhus fever in a mild form still lingers in New York.—E. W. G.]

P. Giuffini[13] reports 5 cases in which he tried a cutaneous reaction with typhoid toxin, after the fashion of Von Pirquet's reaction with tuberculin. He concludes that the reaction is of no value in diagnosis.

Treatment.—T. R. Boggs[14] (Baltimore) points out that under the **Bath treatment** skin complications are more frequent than they are in other methods. He believes the causes to be the softening of the patient's skin by the frequent application of water, and the additions

to the ordinary flora of the skin by the passage of fæces and urine into the water during the bath—a not infrequent occurrence. In order partly to harden the skin, partly to antisepticize the water, he adds commercial alum to the water. "One pound (500 grams) of powdered alum is quickly dissolved in a little hot water and added to the tub during the filling. With the average tub of about 100 to 110 gallons (450 to 500 litres), this makes approximately a 1–1000 solution." The author gives figures in support of his statement. (See also *page* 5.)

H. T. Wilson[15] (Capt. R.A.M.C.), records six cases of treatment with **Antityphoid Vaccine.** The doses employed were from 250 to 500 million bacilli, injected at intervals of a few days. The cases were not severe, and they were all brought under treatment early; but it appeared as if a decidedly beneficial result came from the injections.

W. J. J. Arnold[16] has treated a considerable number of cases with **Turpentine Enemata.** An enema of turpentine 1 oz. and olive oil 1 pint is given by a funnel and tube slowly, the foot of the bed being well raised. On each of the two following days, the same quantities are repeated. Then the amount of turpentine may be reduced to ½ oz. and the olive oil to 15 oz., administered on alternate days, until convalescence is established. If the case is seen early, a small dose of calomel should be given before the course of turpentine enemata is commenced.

The **Surgical Treatment of Perforation** in typhoid fever has for some time past been recognized as the best, in fact the only, treatment. From the published accounts it would appear that recently, in the large majority of cases that offer any hope of recovery, the proportion of successful cases has been higher than it was when the operation was first introduced as a regular measure. This may be due partly to the greater attention that has been paid to the early diagnosis of perforation, and partly to improvements in the after-treatment. Though enteric fever is still very prevalent in the British Islands, it is not so rife as it is in many parts of the United States and Canada; hence it is that recent papers on the subject come mostly from writers on the other side of the Atlantic. Some operators have had remarkable success.

Peregrine Wroth, Jun.,[17] of Hagerstown, Md., has given a detailed account of four successful cases which were under his care in the Union Protestant Infirmary at Baltimore. The object of the paper is to emphasize what the writer believes to be the very great value of the modified **Fowler-Murphy After-treatment,** carried out in each case as follows: "The patient on returning to bed from the operation-room was placed as nearly bolt upright as was compatible with comfort and strength. In all these cases the patients were able to maintain the upright position more consistently than is the rule, and in no one of them were any untoward effects observed. This position was maintained uninterruptedly in all for at least four days, and in two

instances the patients, seeming more comfortable in this position, were allowed to sit bolt upright for a week.

"As soon as the patient had been placed in an upright position, the continuous administration of salt solution per rectum was begun. The apparatus . . . . consisted of a metal frame holding a glass infusion flask and a glass funnel. The salt solution, controlled by a stopcock, was allowed to flow, one drop at a time at a fixed rate, from the flask into the glass funnel. From the funnel the solution was conducted to the rectum through a long rubber tube terminating in a very fine rubber catheter. The solution was kept at the proper temperature by passing the conducting tube between two hot-water bags laid on a stand beside the bed. By means of this apparatus patients can be given from two to six litres (1 litre is a little over 35 fluid oz.) of salt solution per day for a week, without causing them any inconvenience and with the loss of very little salt solution."

Wroth uses one or two cigarette drains to the pelvis, and a strip of gauze to the sutured portion of gut. For stimulation he advises strong black coffee, first filtered, in the proportion of 400 cc. of coffee to 600 cc. of salt solution (14 to 21 oz.) given per rectum continuously if possible for twelve hours at a time. As soon as the patient becomes conscious after the operation, fluid should be given by mouth, at first in small quantities, but rapidly increasing to full liquid diet.

A propos of the apparatus described above for saline injection, in order to maintain the temperature of the saline solution at a uniform degree for continuous rectal injection, H. W. P. Young[18] uses a "Thermos" flask. "All the additional apparatus necessary are a U-shaped piece of glass tubing with one arm long enough to reach to the bottom of the flask; three or four feet of rubber tubing attached by one end to the glass tube and connected with the catheter by the other; and, lastly, some means of limiting the flow, such as a metal clip on the rubber tube or the introduction of a tap such as that supplied with the Rotunda douche. The flask is filled with saline solution at a temperature a few degrees above that at which it is desired to administer the injection, and suspended two or three feet above the patient's bed. The fluid is then run off by syphonage and the flow regulated by the tap or clip." The rate of flow required is usually one drop a second. A pint "Thermos" flask will last for two hours. Lennox Wainwright[19] has devised a similar apparatus, which can be obtained from Messrs. de Luca & Co., 6 and 7, Long Lane, London, E.C.

Three of Wroth's cases presented particular points of interest. In the first, a man of thirty-eight, four perforations were found in the ileum a foot above the cæcum; one of them was large enough to admit a thumb, and was freely draining intestinal contents. The portion of gut containing perforations measured about eight inches. The small perforations were closed with purse-string and mattress sutures of fine black silk. The large one was drawn into the wound and packed round with iodoform gauze, and its edges were sutured

to the parietal peritoneum, the sutures passing through the gauze packing. "Owing to the excoriation of the skin by the drainage from the enterostomy, the patient was placed in a continuous tub on the twelfth day and kept there for two weeks." Three weeks after the operation the patient was taking solid food. About three months after the operation, as there was still a fæcal fistula, six inches of the gut were excised and a lateral anastomosis done. He made a good recovery. In a second case, a girl of six years, a week after the operation (suture of the perforation), "the perforation apparently re-opened, at least in part, and for a week there was a slight fæcal discharge. This, however, ceased spontaneously, and recovery was otherwise uneventful." In the third case, a boy of twelve years, on the sixth day after the operation (suture of the perforation, which was very large), the abdomen became much distended, the patient's temperature rose to 106° F., and the pulse to 180. So great was the distention that a loop of distended gut presented at the lower end of the wound. "An intestinal obstruction was diagnosed (this having been feared at the time of operation on account of encroachment on lumen of gut by closure of perforation; an opening was made with a cautery in the wall of the distended loop of gut presenting in wound, and the abdominal condition was promptly relieved." The patient then improved rapidly; but twenty-eight days later symptoms of obstruction again arose. These were relieved by enemata given through the enterostomy wound, accompanied by vigorous abdominal massage. The fistula gradually closed up, and the patient recovered completely.

Wroth lays much stress on the absence of liver dullness in cases of perforation; but his experience was not very large, and the majority of observers do not attach very much importance to this sign (e.g., Elsburg, Finney, Shattuck, Warren, Cobb, Harte and Ashhurst, and Jobson and Gittings[20]). He also draws attention to the fact that a patient may perforate with consequent severe abdominal pain and other symptoms, and that the pain and other symptoms may temporarily pass off and lull any suspicion the medical attendant may have. [Such an event is by no means uncommon, and I drew attention to its occurrence in a paper published some years ago.[21]—E. W. G.]

In the detailed account, the writer more than once states that the proposed operation could not be immediately performed because the consent of the patient's friends had not been obtained. It is a good plan to interview the friends of a patient immediately the latter is admitted to hospital, to explain to them the chances of perforation and the necessity of early operation in event of its occurring, and to obtain their written consent to its being performed, if necessary. [I introduced this plan at the Eastern Hospital some time ago, and have very rarely met with refusal.—E. W. G.]

Jobson and Gittings,[22] of Philadelphia, have published an exhaustive analysis of 44 cases of operation for perforation in children under

16 years of age. The paper deals with published cases, so that the recovery rate (50 per cent, 22 out of 44 cases) is probably too high to be correct: there is an inducement to publish only successful cases. The youngest of the patients was four years of age. With regard to the establishment of a temporary fæcal fistula, as occurred in some of Wroth's cases, the authors write as follows: "The favourable influence of the development of a fæcal fistula upon the prognosis, and the arguments based thereupon in favour of primary enterostomy instead of suture of the perforation at the time of operation, have been touched upon in the consideration of complications. [The authors have quoted some cases in which recovery took place though a fistula formed.] Hays recommends enterostomy as a routine measure. . . . Without doubt, enterostomy is an operation which is growing in favour, both for obstruction and for peritonitis. The question of its routine employment may still be considered an open one. The near future will determine whether its disadvantages are offset by a decrease in mortality when it is adopted. We are heartily in favour of anchoring the sutured segment of the bowel in the wound, which was done in two of our cases with favourable issue." Irrigation of the peritoneal cavity should be performed when the cavity is flooded with intestinal contents or inflammatory exudate. Evisceration should never be employed in children, on account of the shock to which it gives rise. The Fowler position with continuous enteroclysis is advised.

A. D. Whiting[23] reports a series of sixteen cases of operation for perforation occurring at the German Hospital, Philadelphia, during the years 1900–1909. Five of the cases recovered, one after the formation of a temporary fæcal fistula.

The most gratifying results after operation are those reported by G. E. Armstrong.[24] Of seventy-eight operations, mostly performed in the Montreal General Hospital, twenty-four, or 30·7 per cent, recovered. He does not give details of his cases, but gives a few notes of some of them. In four cases two operations were performed, the second for a fresh perforation; one of the four recovered. Of two other cases he writes that "the suspicious-looking gut was delivered and cared for outside. The gut was wrapped in gauze and allowed to rest on the abdominal wall. These two, after doing well for a time, ultimately succumbed, one of them to pneumonia." Another observation made by this writer is that "one should not conclude that there is no tenderness present without making a rectal examination." The affected loop of gut may lie in the pelvis, and forward pressure made by the finger in the rectum may cause acute pain. In these cases there may be frequent and painful micturition.

Few operators with an extensive experience have not met with cases where perforation has been diagnosed, but laparotomy has not disclosed the perforation. In some cases the peritoneum has been normal or almost so. Armstrong had two such cases; Whiting had two; Mitchell[25] had seven out of ninety-three operations; Wroth also mentions a case.

A case of spontaneous rupture of the spleen during typhoid fever is reported by R. C. Bryan[26] (Richmond, Va.). The spleen was removed, but without saving the life of the patient. He gives a complete list of all the recorded cases.

Prophylactic Inoculation.—F. F. Russell,[27] of the Medical Corps, U.S. Army, after a careful investigation of the immediate results of the administration of 3600 doses of antityphoid vaccine, and a study of what has been published on the subject by others, concludes: (1) Vaccination undoubtedly protects to a very great extent against the disease. (2) It is an indispensable adjunct to other prophylaxis among troops and others exposed to infection. (3) It is very doubtful if there be an increase of susceptibility following inoculation. (4) Vaccination during the disease, for therapeutic purposes, fails to reveal any evidence of a negative phase. (5) The statement that vaccination should not be carried out in the presence of an epidemic is not justified by the facts at hand. (6) The procedure is easily carried out, and only exceptionally does it provoke severe general reactions. (7) No untoward results have occurred in the series of 3640 vaccinations.

C. Scaife,[28] Capt. R.A.M.C., gives an account of the results of protective inoculation in Kirkee for one year. The average annual strength of British troops in Kirkee during 1909 was 877 (there was a quarterly change in the infantry which prevented the actual figures being given). The average annual number of N.C.O.'s and men inoculated was 45 per cent of the whole, and the average of uninoculated 55 per cent. Twenty-three cases of typhoid fever occurred among the uninoculated, with three deaths, and four among the inoculated, with no deaths. The cases were of average severity, and complications (except in the four cases amongst the inoculated) frequent. (See also *page* 63.)

References.—[1]*Proc. Roy. Soc. Med.* Nov. 1910; [2]*Jour. R.A.M.C.* (edit. art.) Ap. 1910, p. 423; [3]*Jour. Amer. Med. Assoc.* Oct. 16, 1909; [4]Wyman and Sons, Fetter Lane, E.C., price 1s.; [5]*Lancet*, Sept. 3, 1910; [6]*Deut. med. Woch.* Aug. 5, 1909, in *Brit. Med. Jour.* epit. Dec. 18, 1909; [7]*Amer. Jour. Med. Sci.* July, 1910; [8]*Bost. Med. and Surg. Jour.* July 28, 1910; [9]*Jour. R.A.M.C.* April, 1910; [10]*Jour. Amer. Med. Assoc.* Oct. 16, 1909; [11]*Med. Rec.* June 25, 1910; [12]*Amer. Jour. Med. Sci.* April, 1910; [13]*Gaz. deg. Osped.* Feb. 15, 1910; [14]*Jour. Amer. Med. Assoc.* June 25, 1910; [15]*Jour. R.A.M.C.* Aug. 1910; [16]*Brit. Med. Jour.* June 23, 1910; [17]*Ann. Surg.* Nov. 1909; [18]*Lancet*, Nov. 19, 1910, p. 1517; [19]*Ibid.* Nov. 26, 1910, p. 1580; [20]*Amer. Jour. Med. Sci.* Nov. 1909; [21]*Lancet*, July 2, 1904; [22]*Amer. Jour. Med. Sci.* Nov. 1909; [23]*Ann. Surg.* May, 1910; [24]*Brit. Med. Jour.* Oct. 29, 1910; [25]*Pennsyl. Med. Jour.* 1908; [26]*Ann. Surg.* Nov. 1909; [27]*Johns Hop. Hosp. Bull.* Mar. 1910; [28]*Jour. R.A.M.C.* Aug. 1910.

TYPHUS FEVER. *E. W. Goodall, M.D.*

Anderson and Goldberger[1] injected the blood from cases of human "*tabardillo*," the typhus fever of Mexico, into monkeys (*Macacus rhesus* and *Cebus capuchinus*), and produced in those animals, after an incubation period of five to eleven days, a fever which continued for thirteen days, terminated by crisis, and presented constitutional

symptoms resembling those of "tabardillo." No rash, however, could be made out in the monkeys. The observers did not succeed in obtaining any micro-organism from the blood of persons ill of the disease. By injecting blood from a human case into the peritoneum of a monkey, a fever is produced after eight days. Blood taken from this monkey's heart four days after the onset of the illness, injected into the peritoneum of a healthy monkey, produced a similar attack of fever. The virus is therefore almost certainly a living organism. It will not pass through a Berkefeld filter.

Discussing the means of transmission of the disease, Anderson and Goldberger are of the opinion that it is transmitted through some intermediary host. They bring forward arguments to show that neither the flea nor the bed-bug is the insect incriminated. The one they suspect is the body-louse. The geographical distribution of the louse (the higher altitudes of Mexico) corresponds with that of "tabardillo." But Anderson and his co-worker failed experimentally to transmit the disease by lice from man to monkeys. They recall, however, the fact that Nicolli, at Tunis, was successful in transmitting typhus from monkey to monkey by means of the body-louse.

As far as the communication of the disease by the blood or blood-serum of a human being suffering from this disease to *Maçacus rhesus* is concerned, and as to the inability of the virus to pass through a Berkefeld filter, Ricketts and Wilder[2] have confirmed Anderson and Goldberger.

There appears to be some doubt whether "tabardillo" is the same as the typhus fever known in Europe.

In a subsequent communication Ricketts and Wilder[3] relate their experiments, which, so far as they go, negative the idea of the transmissibility of typhus (tabardillo) by bed-bugs and fleas, but afford support to the supposition that the infection may be conveyed by body-lice which have been hatched from eggs laid by lice that have fed on a patient suffering from typhus, the young lice not having themselves so fed. The young lice were made to feed on a monkey (*Macacus rhesus*). This monkey did not, so far as was observed, develop typhus fever; but it proved to be immune to the intraperitoneal injection of 3·5 cc. of virulent typhus blood from a typhus patient. The experiments were much too few to be conclusive.

References.—[1]*Weekly Rep.* Feb. 18, 1910, Pub. Health and Mar. Hosp. Serv. U.S.A. in *Brit. Med. Jour.* Epit. May 7, 1910; [2]*Jour. Amer. Med. Assoc.* Feb. 5, 1910; [3]*Ibid.* July 23, 1910.

ULCERS, CHRONIC. *E. Graham Little, M.D., F.R.C.P.*

Allan Jamieson and Cranston Low[1] describe and endorse the method long used by Hecker for the treatment of varicose veins and ulcers. For varicose veins the detailed directions are as follows: The limb must be thoroughly cleansed (shaved, and scrubbed with soap and hot water), mopped over with ether, and all the visible dilated veins painted over with ichthyol-collodion (10 per cent), and then **Zinc Jelly** applied. This is made by pouring into a vessel heated over a water-bath, 40

parts of water, 10 parts powdered gelatin, and stirring until dissolved. To this are added 40 parts of glycerin with 10 parts zinc oxide intimately mixed. When thoroughly mixed and melted, this is removed and cooled, and may be kept indefinitely in a closed jar. The limb is smeared over with the jelly, and closely and evenly bandaged with a double-headed starched muslin bandage, dipped in water and squeezed out. This bandage may remain undisturbed for weeks, or even months. When eczema or ulcers are present, the ulcer must be cleaned and covered with a thick layer of airol and cotton-wool, and then treated as above detailed.

Phagedænic Ulceration of Abdomen.—Lockett[2] reports a remarkable case of an enormous gangrenous ulcer of the abdomen in a middle-aged man with no specific history. The constitutional symptoms of high fever and severe illness, together with the rapid spread of the ulcer, which reached the dimensions of 5½ in. by 10½ in., decided a radical treatment. The patient was anæsthetized, and the whole ulcerated surface and outer margin of the skin were thoroughly cauterized by **Paquelin Cauteries,** the surface swabbed over with pure carbolic, and then with alcohol and dressings of bichloride of mercury. The cultures from the ulcerated surface showed, aerobically, *Staphylococcus aureus*; anaerobic cultures were overgrown by *Staphylococcus aureus*. Film preparations showed some spindle-shaped bacilli as well, but these would not grow. The resulting cicatrix was excellent, and the patient made a rapid recovery.

Agnes Savill[3] was able to give relief to a patient with two painful ulcers, the result of *x*-ray burns, by practising **Hilton's Method** of severing the sensory nerves before they entered the ulcerated area. Cleland[4] recommends a mixture of equal parts of **Carbolic Acid** crystals and **Camphor** for local application to small ulcers, e.g., about the mouth; in the latter position, a probe carrying a pledget of cotton-wool soaked in this mixture (which makes an oily lotion) may be used.

Willmott Evans[5] commits himself to the statement that 90 per cent of the chronic ulcers of leg are syphilitic in origin, and, holding this view, he attaches special importance to internal treatment. He recommends a course of **Iodides** until the ulcer is healed, and then the administration of **Mercury.** Sodium iodide he prefers to potassium, and advises large doses—20 gr. three times a day may be needed. If iodine is not well borne in this form, a vegetable compound may be substituted, e.g., **Sajodin,** and it is well to combine quinine, iron, and strychnine with it. For local application, fermentations made with a drachm of **Boroglyceride** in half a pint of hot water are recommended. For cleansing the surface, one of the best means is washing with **Tincture of Iodine** diluted with four to five times its volume of water. To prevent the sticking of dressings to the wound, ointments of ammoniated or yellow oxide of mercury may be used. Attempts may be made to heal the ulcer with drying applications, e.g.:—

℞	Zinci Oxidi	ʒiij |	Kieselguhr	ad ʒj
	Calomel	ʒss |		

This must be applied quite dry, and in sufficient quantities to absorb the discharge.

McDonagh[6] and Marshall[7] question Willmott Evans' statement as to the proportion of syphilitic to nonsyphilitic ulcers, a proportion which is certainly difficult to accept. McDonagh condemns fomentations, considers iodides futile if syphilis is actively present, mercury and not iodine being the specific for syphilis, and prefers the following course. The ulcer is to be cleaned up as for an operation : the surface swabbed with pure **Carbolic** and then with **Absolute Alcohol,** and dressed with sterilized gauze spread with **Lassar's Paste.** A second method recommended by McDonagh is described as follows : **Scarlet-red** (an aniline dye) is dissolved in chloroform and made into an 8 per cent ointment with vaselin. A thin layer of the ointment is spread on a piece of calico and applied to the ulcer, but not allowed to remain for more than twenty-four hours. Boracic ointment is then applied for two days and the scarlet-red repeated, and so on. In quite a short time the ulcer granulates up. Great care must be taken to clean the ulcer well before using the scarlet-red. This method of treatment either brings about complete healing of the ulcer or makes the surface suitable for skin-grafting.

[For the employment of **Sea-water Plasma** in tuberculous ulcers, see *page* 51.]

References.—[1]*Edin. Med. Jour.* Feb. 1910 ; [2]*Ann. Surg.* Sept. 1909 ; [3]*Lancet,* Dec. 18, 1909 ; [4]*Austral. Med. Gaz.* Jan. 20, 1910 ; [5]*Lancet,* Nov. 13, 1909 ; [6],[7]*Ibid.* Nov. 20, 27, 1909.

URÆMIC CONVULSIONS.

(*Vol.* 1910, *pp.* 174, 432)—In cases of uræmia with high arterial tension, convulsions should be treated by **Venesection. Lumbar Puncture** is also of considerable value.

URETERS, SURGERY OF THE. *E. Hurry Fenwick, F.R.C.S.*

Pain in Ureteric Stone.—Morton[1] draws attention to the fact that sharp percussion of the loin in some circumstances causes pain when the stone is firmly fixed in the ureter well below the kidney. He considers the pain of colic is probably due more to violent contraction of the muscle of the duct, than to the passage of the stone over the mucous membrane.

Bevan[2] makes a good point in one of his lectures. He says he is convinced :—(1) That renal colic is the cause of a greatly increased intrarenal tension due to a plugging of the ureter ; (2) That the passage of a stone through the ureter does not of itself cause any pain at all. He has had the opportunity of determining these facts clinically in several cases, and cites as the best proof the following case :—

A young woman of twenty-two or twenty-three had an attack of kidney colic, due to stone the size of a robin's egg. This was removed successfully, but later this kidney became the seat of tuberculosis, and it was removed. Several years later she was brought to the hospital suffering from complete anuria. She was in great pain, and had not passed a drop of urine for several days. Bevan at once made a nephrotomy under nitrous-oxide anæsthesia, and drained her solitary kidney. The pain was immediately relieved by the

drainage. An *x*-ray picture the next day showed a stone in the upper ureter about the size of a coffee-bean. Four or five days later, the *x*-rays showed the stone in the lower ureter, and ten days later, without any pain or symptoms, she passed the stone per urethram.

In all this passage through the ureter after the kidney was drained, the stone gave rise to no pain whatever. Of course, this merely demonstrated clinically what experimental distention of the pelvis has taught us for some years, viz., that intrarenal tension is the cause of kidney colic, and not the passage of the stone through the ureter. (Compare "Distended Renal Pelvis," under KIDNEY.) Another interesting fact is taught by this and similar cases, namely, that the passage of the stone is not due to *vis a tergo*, but to the peristaltic action of the muscle fibres of the ureter seeking to pass the foreign body along.

Ureteric Stone or Appendicitis?—Practitioners will admit that distended renal pelvis (*q.v.*) has frequently been mistaken for appendicitis; also that the two affections frequently co-exist; indeed, some observers believe that a large percentage of chronic appendicitis is a constant accompaniment of right floating kidney. Hence it is essential, in the presence of chronic pain in the appendix region, to eliminate floating kidney, and in the presence of a floating kidney, definitely to exclude the presence of appendicitis. There is often, however, a real difficulty in distinguishing between the acute onset of an appendicitis, and an acute onset of descending renal calculus on the right side. Even the best surgeons have been known to fail in an accurate diagnosis between the two conditions. At present there seems no real symptom—subjective or objective—which is an infallible differentiating mark. If any exist, it is the presence of blood-cells in the urine and the frequency of urination, which often marks descending renal stone; and in males, the retraction of the testicle.

Bevan has had at least four cases in 1,500 appendix operations in which a mistake had been made, and the symptoms were found to be due to kidney or ureter stones, and not to the appendix. He says: "A clinical diagnosis can usually be made in those cases giving a typical history of ureteral colic, combined with the presence of blood, or pus, or perhaps both, in the urine; pain and tenderness on palpation along the course of the ureter may be looked upon as additional aids towards making a diagnosis, but they are not always present, and in stout individuals they may be difficult to elicit."

Bevan has no hesitation in stating that, with very few exceptions, the *x*-ray treatment can be relied on to show stones as large as a bean. "I think," says Bevan, "that it is fair to say that, with good technique, the percentage of error is less than 5 per cent. Our present confidence in the accuracy of the *x*-ray test is based on both laboratory and practical proof that the less dense of the urinary calculi possess sufficient absorbing power for the rays, so that they may be detected in critical skiagraphs. To be sure, the shadows are less pronounced in the case of small, flat, or soft stones, and perhaps difficult to obtain in corpulent individuals; yet an error is more likely to result, in a difficult

case, from a faulty technique or interpretation than it is from any inherent lack of virtue in the method itself properly carried out.

The Removal of Stone in the Lower Ureter.—A new method is advocated by an American surgeon for the removal of lower ureteric stone. He advises that the stones which have lodged in the lower ureter near the bladder, should be routinely treated by separating the entire pelvic ureter from its bed, by lifting it with its enclosed stone bodily to the surface, and by bringing it out into the abdominal wound (just as the kidney used to be examined), by incising the ureter—removing the stone, stitching the wound, and dropping the ureter back.

[Criticism by Editor of Section.—It is rarely that a collaborator of the *Annual* has to deprecate the line of treatment which has been advocated in the literature of the year; but in this case my duty seems so absolute, that I have no choice in the matter, for I feel sure the advice tendered is unsafe, for it is unsound. Of course, I do not contend but that, in isolated instances, a very loose, healthy ureter may be detached in a very thin person, so far as to enable it to be brought out on to the surface; but it will rarely happen that the ureter, if it has lodged a stone for any considerable period, is sound enough to bear such a strain. Most experienced urological surgeons will agree:—

1. That the ureter at the site of the impacted crystalline-surfaced oxalate stone is soft and succulent, and easily torn; moreover, most of the recent impaction stones have a crystalline or jagged surface.

2. That the stripping up the pelvic ureter in the operation for ureterostomy, devitalizes it so much that its end sometimes sloughs off. Stripping a ureter so freely as to lift it must devitalize it.

3. That in a few cases there is so much matting of the ureter to the surrounding tissues that it is impossible to dissect the ureter out even at the autopsy, unless its outer wall is left attached to the inflammatory bed in which it lies; and as for lifting such a ureter as this two inches from its bed, this is not surgery but savagery.

The force which arrested renal surgery quite a decade was the belief that the true surgery of the kidney consisted in *always* freeing the kidney and in *always* lifting it bodily out of the wound, whether its pedicle was short or long, or whether the kidney was fatty and therefore easily torn, or whether it was normal in consistence; whether the parietes were very thick, or whether they were extremely thin. The end results of such procedure as a *routine* practice were lamentable: kidneys were sacrificed, and progress was impeded. Modern work advises operators to lift the kidney to and through the wound if it can be done without undue strain, and therefore without endangering the integrity of the gland; but if injurious tension must be exerted on the vessels to effect this, the exploration must be performed whilst the kidney is in situ, though this procedure is not easy. Now I submit the same rule should guide operations on the lower ureter. I contend the advice to routinely lift the ureter through the wound will quickly arrest the development of surgery of the lower ureter, for it will be followed by many

accidents, such as ureteric breakage, ureteric stricture, even ureteric sloughing, any of which may entail nephrectomy, and therefore unnecessary mutilation.—E. H. F.]

Transperitoneal Uretero-lithotomy.—For the last decade surgeons have removed stones from the lower ureter through an extraperitoneal iliac incision, many making a slit in the peritoneum itself if there is any difficulty in detecting the stone, and inserting their hand, searching the peritoneal surface of the ureter, and attempting to press the stone a little higher up the tube, so as to permit its being removed nearer the external wound, and thus to allow of a shorter drainage tube. It is admitted that when the stone is very near the bladder, the operation can be most difficult, and that the drainage is a matter of some concern; more so, perhaps, since the drainage tubes in Moschcowitz's[3] case of bilateral ureteric stone caused necrosis of both iliac vessels on the seventh day after the operation, and except for the coolness and prompt bravery of the operator, would have caused the death of the patient in a few minutes from profuse arterial hemorrhage.

Transperitoneal attack on the Lower Ureter.—The tendency has been lately to attack lower ureteric stones transperitoneally, and Sinclair White,[4] in an able article, supported by two successful cases, advocates the attack on *lower* ureteric stones by means of an ordinary median incision transperitoneally. "Surgical traditions have at all times stood in the way of progress," says Sinclair White, "and nowhere could a better instance of this be found than here, where the *noli me tangere* attitude of a past generation of surgeons towards interfering with the peritoneum still holds sway, and still is fortified by the dicta of masters in urology. That it should be so may be explained, partially at least, by the experience of operators who have confined their work to extraperitoneal methods, whether conducted from above or below. In all these operations, the surgeon works at the bottom of a deep and narrow wound, where space and light are at a minimum, and the accurate placing of sutures well-nigh an impossibility. Indeed, many operators, impressed by the hopelessness of the task, make no attempt to suture the ureter."

[Criticism by Editor of Section.—Sinclair White quotes several operators who have had successful cases treated by the method. Unfortunately, the two cases he has himself put forward in aid of his contention, are precisely those in which the stones could be pressed up from the deep pelvis to a level with the iliac crest—to a point at which, in fact, the ureteric incision can be easily sutured, because it is within easy reach; because the walls can be soundly sutured—for they are here greatly thickened by ureteritis and back-pressure, and therefore hold the ligatures well; and because the stone or stones have not been resting against this particular section of the ureter, and have not rendered it soft and unhealthy for the healing process. Under such conditions there is no difficulty in preventing leakage; but it is otherwise when the stone *cannot* be shifted from a point just by the bladder deep in the pelvis, and the ureteric

incision has to be made *over* the stone, where the attempt at stitching the wound in the ureter has to be made at a great depth. These are the cases which surgeons are anxious to treat wisely—and these are those in which the end results of a transperitoneal attack have to be collated and considered before this route can be always adopted with safety and without anxiety.—E. H. F.]

Sinclair White's contention is, however, too lucid and too valuable to be considered lightly. It is time the whole matter was reconsidered. He says : " The reasons for assuming that the transperitoneal operation is a dangerous one, resolve themselves into (1) Fear of infecting the peritoneum during the operation, and (2) Danger of urinary leakage subsequently." He makes the following statements :—

" The urine in most cases of impacted ureteral calculi is sterile ; and when it is not so, the virulence of the organisms it contains is no greater than that of those found in a suppurating appendix, or in a pyosalpinx, lesions which, when dealt with by modern methods, have scarcely a mortality. Again, in Wertheim's operation for advanced uterine cancer, the ureters are divided and implanted into the bladder, when necessary, with the happiest results."

The advantages which White claims for the transperitoneal operation are : (1) That it, and it alone, enables us to clear up doubtful diagnoses. Thus, in the second of his cases, the patient complained chiefly of pain on the left side, and although the *x*-rays left no doubt as to the presence of calculi in the right ureter, they also revealed a fairly well-developed shadow on the left side, and as a matter of fact, the diagnosis arrived at previous to exploration was bilateral ureteral calculi. Intraperitoneal palpation showed the left ureter to be free from a calculus, while the origin of the shadow of the pseudo-calculus was traced to a calcified mesenteric gland. Had the extraperitoneal route been adopted, there would have been a second and wholly unnecessary operation performed in this case. (2) White claims that it is a less difficult operation than any of the extraperitoneal procedures. It ensures plenty of room and an abundance of light, for the operator is able to carry out the steps it entails with little or no disturbance of the surrounding parts, and with an amount of precision quite unattainable by any other method.

Sinclair White describes the technique of the operation he suggests as follows : By placing the patient in the exaggerated Trendelenburg posture and employing the median suprapubic route, the intestines fall away to the upper abdomen, where they are securely walled off by one or more towels. If retractors are now used to separate widely the edges of the abdominal wound, a clear and uninterrupted view is obtained of the line of the right ureter throughout its lower two-thirds, while the line of the left ureter can be almost equally well observed if the meso-sigmoid is displaced inwards below, and outwards above, the pelvic brim. In thin subjects the ureters can be distinctly seen where they cross the brim of the pelvis, and by running a finger along their course, so as to displace the subperitoneal fat, it is possible

to follow them with the eye for some distance both upwards and downwards.

But whether they are visible or not, they can be easily palpated with the fingers, and *there should be no question of missing a calculus in the pelvic ureter* (*sic*). The stone can usually be displaced up to the pelvic brim, which is the most convenient place from which to extract it. The portion of ureter about to be opened is surrounded with gauze, and the peritoneum divided over it. The stone is next grasped between the fingers and thumb of the left hand, and, while so held, the ureter is clearly divided over it in a vertical direction. Should there be any leakage, this is at once mopped up. The wound in the ureter is closed by two or more fine catgut sutures passed after the manner of Lembert. These, while just missing the mucous membrane, secure firm and accurate apposition of the cut edges, which are slightly inverted. The small opening in the peritoneum is sutured in the usual way and, after removal of the gauze and towels, the abdomen is closed without drainage. Owing to the inverted posture of the patient, and to the fact that intraperitoneal manipulations temporarily inhibit the renal function, there is usually no escape of urine when the ureter is incised ; but if there should be any reason for dreading this, the ureter above and below the site of operation may be temporarily occluded by ligatures. In cases of pyonephrosis and hydronephrosis, where the ureter is distended and tense, it should be aspirated, and temporary ligatures applied, before opening it. Finally, if drainage of the operation area is thought to be desirable, it can be readily and efficiently provided through a small opening in the flank, the drainage tube ending just short of the place where the ureter has been incised, and of course extraperitoneally. Where drainage is contemplated, the stone should be pushed up as high as the level of the iliac crest before it is removed.

[Criticism by Editor of Section.—If it can be shown by further experience that leakage into the peritoneum of urine, such as pours down a ureter long obstructed by a calculus, is of no moment, then there is no question but that the transperitoneal operation of ureterolithotomy will become the operation of choice ; but I question if the leakage is of no moment, and that it is difficult to prevent a leakage if the stone is near the bladder, for the suturing at such a depth is difficult. I can state with confidence that stones which have been lodged for any time in the lower ureter can very rarely be slipped up the ureteric tube by manipulation, even for an inch, let alone for that four or five inches which is necessary to bring them into the iliac crest, as Sinclair White suggests is advisable.

The reason for this is, that in most instances a stone which has been long impacted is tied up in a dilatation of the ureteric tube, like the sweet in a Christmas cracker or the meat in a sausage, and that it is next to impossible to pinch or press most of these stones up the tube past the narrowed portion (*vide Fig.* 85), unless the tube splits under the undue pressure, or unless the end of the stone brings away on its

nose the entire collar of swollen mucous membrane, and this spells subsequent ureteric stricture. Moreover, I assert that if the smooth aseptic lime-phosphate stones are excluded, no stone that has become lodged in the ureter for any time can ever be pushed up or pulled up the tube, without causing the most grievous destruction of the softened mucous membrane of the ureteric tube, a destruction which entails subsequent warping, and a tendency to reformation of stone of a phosphatic type at the site of the traumatized areas. Lastly, I contend that the organisms of a pyonephrosis are not analogous to those of a suppurating appendix or a pyosalpinx. I hardly think it is realized that the drainage of an inflamed kidney pelvis often contains the most virulent toxins, which when in contact with post-peritoneal tissue cause urinary suppression of the acutest character. This, in my opinion, is the danger of the leakage, and this, I believe, will materially limit trans-peritoneal uretero-lithotomy to those cases in which *sterile* urine is secreted. It might be pertinently asked, Why should the suggestion of transperitoneal uretero-lithotomy be designated as a step in advance—a valuable addition to our procedures for stone in the lower ureter? The answer is, Operative procedure now lags behind diagnostic precision. The time will come when an impacted stone in the pelvic ureter will be a sign of incompetence either of the radiographer or the clinician; and the operation will be performed when the stone is caught at its first fence, when the urine is sterile, and where the stone is easily accessible, and the ureter easily stitched, that is, at or above the iliac crest. But at present, radiographers are not all equally expert, and stones are allowed to get into the lower ureter. Hence I am sure, if the operation on the lower ureter was rendered easier—and it may be one of the most difficult in the entire range of surgery—it would be performed earlier, before the inevitable changes have taken place in the kidney; and the object of true renal surgery—and this is the surgery of the future—is to prevent material change in the secretory structure of the gland. We read of operators who remove stones from the lower ureter, and who yet state there was little or no renal change ensuing from the ureteric obstruction. This is an error due to faulty examination of the kidney; every kidney, even slightly obstructed by a ureteric stone, suffers—some more, some less—the amount depending on *inherited* renal health. Unless the fingers are accustomed to detect back-pressure changes in the kidney, the plump, apparently healthy-looking cortex deceives, and the kidney can easily lose an eighth or more of its internal parenchyma without external evidence.

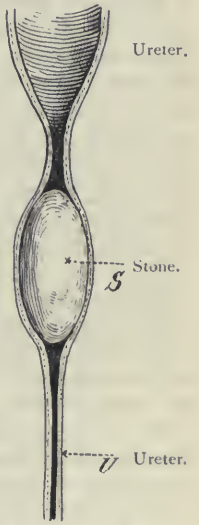


Fig. 85.—Stone impacted in ureter.

To sum up: I am sure that the judicious surgeon of the future will not attack every stone he encounters in the lower ureter by the same route. He will take into account the sterility of the urine, the exact position of the stone in the ureter (as estimated, not by the radiographer, but by the centimetre-marked *x*-ray ureteric bougie used through the cystoscope), the size of the stone which determines the capacity of the ureter above it, the grade of ureteritis present as estimated by ureteric meatoscopy; and upon these findings he will select the vaginal route or the iliac-extraperitoneal route, with one hand in the peritoneal cavity, or the transperitoneal, with or without temporary ureteric drainage above the iliac crest, and even in some cases the para-sacral route.

Very apposite and opportune to this question is the valuable article by Dellinger Barney[5] on the experimental intraperitoneal division of the ureter, in which he deals primarily with the effects of the leakage of normal sterile urine into the peritoneal cavity. As the subject will prove of such importance in the future, the experimental work is given in some detail. His plan was to produce a urinary extravasation by cutting one ureter and allowing its urine to flood the peritoneum. This has the advantage of allowing sufficient urine to be excreted by the sound kidney, and furnishes urine as sterile as any that can be obtained. This was done by Barney on 40 animals: 26 herbivora and 14 carnivora. The effects of this operation were as follows. Primary union of the laparotomy wound occurred in only 50 per cent of the herbivora, never in the carnivora. Dogs and cats become at once desperately ill, and always die of sepsis in from four to eleven days, occasionally showing uræmic symptoms such as diarrhœa and vomiting. Rabbits are little if at all affected, and always recover. An autopsy was done in every case. Adhesions between omentum or gut and the wound were nearly always present. Free fluid, containing urea, was found in the abdomen in about 50 per cent of the cases. It was greater in amount in animals killed within the first forty-eight hours than in those killed at a later time.

In these findings, Barney disagrees with Ferraton, whose observations (in cases of intraperitoneal rupture of the bladder) showed less fluid in the early than in the later cases. He claims that this is because the fluid is absorbed by the peritoneum as fast as it is poured forth, until peritonitis sets in (which it does in the first forty-eight hours or so), when the absorptive power of the peritoneum is gradually lost, and the fluid simply accumulates in an inactive cavity. This coincides with the theory of Wagner that the absorptive power of the peritoneum depends on the peristaltic movements of the intestines and aspirating power of the diaphragm, and that these activities cease with the onset of peritonitis. Barney's belief is, that in spite of the great power of absorption possessed by the peritoneum, it cannot keep pace with the great effusion occurring soon after the peritoneal insult; hence the free fluid seen in early cases. The absence of fluid in the later cases may be explained by the fact that the effusion of urine and serum has

stopped, and that the quantity already poured forth is sooner or later absorbed in spite of the presence of peritonitis.

The fluid was usually clear, yellowish, and of a urinous odour. When tested, it always showed the presence of urea. Occasionally it was bloody and turbid and, in carnivora, purulent.

Peritonitis was always found, appearing earlier in rabbits than in dogs. In herbivora it is quite noticeably localized to the side of the divided ureter.

Walling off the Divided Ureter.—In 77 per cent of cases, best seen in rabbits, distinct walling off of the divided ureter was accomplished by adhesions between gut, omentum, abdominal wall, and ureter, in one or more combinations, forming a unilocular or multilocular cyst. For instance, in a rabbit operated on in the usual way for division of ureter on July 10th, nothing abnormal was noted about the animal's condition for a week. It was then killed with strychnia. Autopsy: On left side of abdomen, two rounded tumours, one above the other, each the size of an English walnut. On palpation these are round, smooth, soft, elastic, and easily movable. Peritoneum smooth and shining throughout; intestines not injected. On removing coils of gut from left side, left kidney is found to be about twice the normal size, soft and cystic. Just below this there is a mass of small intestine matted together and forming a tumour the size of an English walnut. Stringy, gelatinous masses of fibrin here and there in this region between coils of gut, some free and some adherent. Kidney-pelvis and ureter much dilated (latter size of a slate pencil), the ureter leading into the mass of adherent gut below. This mass is cystic, and on squeezing, first it, and then the ureter, fluid is easily seen to be transmitted from one to the other. This cyst opened with the escape of about two ounces of clear, amber fluid, which could be seen to gush out from the distended ureter, with subsequent collapse of the latter. Cyst cavity lined with thick, œdematous, translucent exudate, presumably fibrin.

Willgerodt, and later De Quervain, also observed this protective cyst formation, and it could not be prevented in spite of every effort on their part. On separating these adhesions the fluid gushed forth as if under great tension.

The proximal end of the ureter was often hard to distinguish, being buried by exudate and œdema. It ceased to functionate, usually in twenty-four hours, but was sometimes seen to eject urine as late as sixty hours after operation. So far as could be determined, its divided end became occluded by:—(1) Direct adhesions to gut or omentum. This was noted by Israel and Grawitz; (2) Blood-clot in its lumen, often extending almost up to the kidney; (3) Organization of exudate: seen only in late cases. Often no special cause could be demonstrated. The distal end of the ureter, with its ligature, presented nothing remarkable.

The bacteriology of these cases was also studied and, curiously enough, in all but one or two cases was a coccus corresponding closely to the *Staphylococcus pyogenes albus*. The question then arose:

whence came the infection? If from extraneous sources, it was unlikely that a pure culture of the same organism would be present in every case, and it is also a fact that even with the mildest asepsis, animals are remarkably resistant to infection. If autogenous, the organism must come :—(1) From the blood-stream through the kidney (hematogenous); (2) From the urine itself; (3) By migration through the intestinal walls.

We know from the investigations of Ford, that every so-called healthy animal harbours many varieties of bacteria in its abdominal organs, and that each type of animal has its special bacteriology. Accepting these statements as true, Barney simply ligated one ureter in several rabbits, but obtained only sterile cultures from within the ureter, even after the lapse of some days. To make infection more likely, he ligated one ureter in another series of animals, and thoroughly bruised the ureter and its kidney. Again the cultures were negative. The results agree entirely with those obtained by Gayet and Cavaillon in similar experiments. Furthermore, in many cases during the operation of dividing the ureter, he took a culture of the urine as it gushed forth, but every one of these cultures was sterile. This is sufficient to prove that infection does not come through the urine or through the kidney.

We may also exclude at once the possibility of an infection finding its way up from the bladder through the distal stump of the ureter. This was closed off by a ligature at the time of operation with this idea in mind.

In an attempt to prove that the infection came from the migration of bacteria through the intestinal wall, Barney examined specially-stained sections of gut, taken at a point where they were adherent to the cut end of the ureter, and where there was the most marked inflammation. Diligent search failed to find any bacteria in the intestinal wall. In another series of animals, the gut adhering to the cut end of the ureter was opened, and scrapings from its mucosa were then planted on agar plates. This proved most successful, for in a case where the fluid from the region of the cut ureter showed the usual cocci, the cultures from the gut showed the same coccus in pure culture. It has already been proved by the work of Posner and Lewin that the *B. coli* at least can easily traverse the healthy wall of the colon. This is perhaps not enough evidence to prove once and for all that this, and no other, is the source of infection, but it is at least most suggestive. Barney feels justified, therefore, in saying that the infection comes from the migration of intestinal bacteria; but why the organism should be a coccus, and not the *B. coli*, or one of that group, he was unable to say.

On comparing clinical cases with his experiments and research, Barney draws these conclusions: Man occupies a place midway between the carnivora and the herbivora in his reaction to an intraperitoneal urinary inundation. Individuals vary greatly, as in other lesions, some being highly susceptible and developing a peritonitis at

once, others living for many days with the abdomen full of urine. As Vincent truly says, "We must recognize great individual varieties in men and dogs in the susceptibility of the peritoneum."

This great resistance is best illustrated by the case of intraperitoneal rupture of the bladder reported by Quick, where operation with recovery was performed eleven days after the injury, and the peritoneum was smooth and shining in the presence of a large amount of urine. Other evidences of the great resistance to the presence of urine in the abdomen are often reported, but it is to be considered that the urine was, *à priori*, sterile.

The evidence, therefore, derived from Barney's experimental work, and from the clinical observations of others, is that the abdomen may bear without damage, and even, in some cases, without severe reaction, the effusion of a certain amount of sterile urine, and that it is able to guard itself against this effusion quite promptly and efficiently by the formation of adhesions. It is also evident, especially in animals, but probably more often than we realize in man, that a divided ureter soon becomes harmless by occluding adhesions or blood-clot. It is in cases where this prompt occlusion does not occur, seen oftenest in dogs, or where the urine is septic from the start, that a general peritonitis sets in.

The Technique of Operations on the Lower Ureter.—There are few parts of the body where it is so difficult to obtain sufficient exposure of the operative field as in removing stones from the lower ureter. Of course, it is easy enough, says Charles Gibson,[6] to make a ruthless incision which resembles the technique of the morgue rather than the operating-room; but the mere completion of an operation does not spell success; its value must be judged by the end results. It cannot be said to be a gain for a patient to have the trouble caused by the presence of a ureteric stone replaced by a huge and weak scar which allows of eventration of the abdominal contents, and therefore by a condition of permanent danger and discomfort. Gibson argues that the ideal method of performing operations on the lower ureter should fulfil the following conditions: The incision of the abdominal wall should be of such a size and situation as to give an ample exposure for the easy recognition of the ureter, the necessary manipulations, and security from injury to the other pelvic structures, particularly the iliac vessels. The incision should be extraperitoneal. It should be possible to make the ureter so freely accessible that any incision in it can be as easily and accurately repaired as a lesion of the intestine. There should be no unnecessary trauma or malhandling of the tissues, so that the completion of the operation should leave a perfectly dry field, doing away (when the continuity of the ureter has been restored) with the necessity of drainage—a prophylactic measure against subsequent hernia. The incision of the abdominal wall should be so planned as to produce the least damage, allowing, when it is closed without drainage, a firm union without risk of hernia. Finally, the whole operation should be so simple, so free from annoying hæmorrhage

or other pitfalls, that it can be performed without undue waste of time—half an hour or less.

These ideals, he believes, can be realized by the Stimson-Pfannenstiel incision. The skin incision runs from the mid-line about a finger's breadth above the pubes, horizontally outward nearly parallel to Poupart's ligament at first (*Fig.* 86), and curves rather sharply upward at its mid-point, to end about opposite the anterior superior spine of the ilium. This incision is deepened in the same line through the aponeurosis of the external oblique and the internal oblique muscle; the latter is the only structure which suffers any real damage, and that only to a slight degree, for the lower part of the incision runs about parallel to its fibres; only the ascending leg cuts across a small part of these fibres. The incision stops short of the transversalis, which is not disturbed at all. With efficient retraction of the upper flap, the external border of the rectus muscle is identified, and the *fascia* of the transversalis is now divided by a vertical incision close to and parallel to the rectus—that is, at *right angles* to the original incision. Two retractors are now inserted—the outer one retracts the cut edge of the transversalis outward, the other pulls the rectus muscle well toward the mid-line. A generous space is thus obtained, situated well toward the mid-line (the lower part of the ureter is practically in the mid-line). The floor of this space is occupied by the peritoneum. The patient being in a complete Trendelenburg position, the peritoneum is easily and gently pushed away, and a free access to the pelvis is secured. So ample is the space and view, that the whole hand can be introduced under the control of the eye, and the ureter manipulated—released—its stone removed, and the incision into the ureter stitched. The wound is closed without drainage and in the usual way. A sterile dressing and a firm binder are applied. Rest in bed for ten days is enjoined, when, if asepsis has been irreproachable, the wound will be found firmly healed, and the patient may resume his usual activities. Gibson records two successful cases.

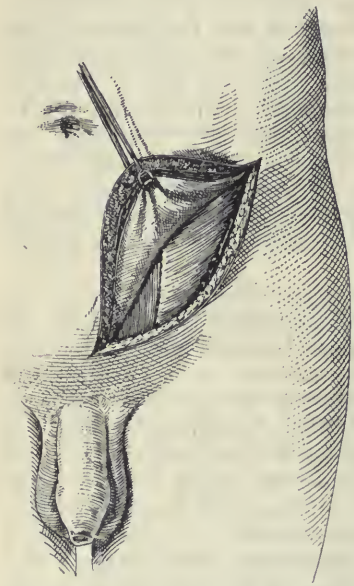


Fig. 86.—The upper flap, consisting of skin, and external and internal oblique muscles, is retracted. The dotted line represents the line of incision in the transversalis fascia.

The Radiography of Reno-ureteric Calculi.—There is now a strongly marked consensus of opinion among urologists, that radiography of

the kidney and ureter is not only of the highest value, but is quite an indispensable factor in the true surgery of the upper urinary tract. It must, however, be **expert** radiography; amateur performances often masquerade as expert work, and as often deceive the practitioner, who cannot be expected to understand shadows or pseudo-shadows, or to detect differences in densities of renal structure. The hardship to the patient lies in the fact that valuable time may be lost by an inexpert radiographer forcing his opinion, based upon his inexpert work, upon the patient and the practitioner, or, worse still, by giving a wrong opinion upon false shadows, and thus encouraging an incompetent surgeon to interfere with cases best left alone. It is also justly held that the operator must be responsible for the detection and translation of shadows—the blame of failure in the production of the shadows should be the radiographer's. Thurstan Holland[7] makes two very important points in a paper on Radiography of Ureteric Calculi. He quotes the following remarkable case — that of a stone which could move freely up and down the ureter:—

A woman, aged forty-five, for six years had had acute attacks of pain in the right loin, together with backache between the attacks. There was a history of hæmaturia, but no blood or pus was found in the urine examined at the hospital. A complete *x*-ray examination showed a small calculus in the right kidney; the kidney itself was clearly outlined and seen to be not enlarged; a very large shadow, over one inch long, and an elongated oval in shape, was noticed in the area of the bony pelvis. At the operation, the kidney stone was found and removed, and the ureter was probed. Instruments passed down the ureter could not be got into the bladder, but nothing in the nature of a stone was felt, and no more was done. She was sent down to the *x*-ray department on her recovery, and furthur plates, stereoscopic and otherwise, were exposed upon the pelvic region. These were not developed at once, but the next day, on development, it was found that the large pelvic shadow had disappeared. It was not possible to get more *x*-rays, as the patient had gone to her home in the country, the previous afternoon. Two and a half months later, she came in again, saying that she was just as bad as before the operation. Another complete *x*-ray examination showed nothing except a large, elongated shadow in the right kidney, exactly corresponding to the shadow previously found in the pelvic region. A few days later, the surgeon telephoned me that he was going to remove this stone from the kidney that afternoon. I asked permission to *x*-ray her again, as she was going to the operating-theatre. This was done, through the pre-operation dressings applied to the kidney region, and there was no stone in the kidney. Another plate showed the stone in the lower end of the ureter; the operation was modified in view of this, and the ureter opened and the stone removed. The ureter was found dilated, and this large stone could apparently move at will up and down its whole length.

The two points which this case emphasizes are worth consideration: (1) Although a stone is found by *x*-rays in a kidney, either by plate or screen examination, or by both, it is nevertheless essential to examine the rest of the possible stone area as well; (2) One must bear in mind these unusual cases, and remember that it is possible for stones to move up and down the whole length of a ureter, even when as large as this one. It is obvious that a small stone may move from kidney to ureter in the interval between *x*-ray examination and opera-

tion, but it is a much rarer occurrence to meet with a wanderer such as in this case. The inference is that no long interval ought in any case to pass between the *x*-ray examination and the operation, and that, should such an interval have elapsed, one ought to confirm the previous examination before the operation is carried out.

Frequency of Ureteric Stone.—Thurstan Holland's percentage of renal stone to ureteric stone is three of the former to one of the latter. This differs markedly from Leonard's statistics, which show two ureteric to one renal stone. Thurstan Holland's advice, though it is tendered to radiographists, is as pertinent to urologists. Insist on the entire tract being radiographed, and always distrust screen vision.

References.—[1]*Jour. Amer. Med. Assoc.* liv. No. 9. Feb. 1910; [2]*Ibid.*; [3]*Med. Ann.* 1910, p. 692; [4]*Brit. Med. Jour.* Jan. 1, 1910; [5]*Ann. Surg.* Mar. 1910; [6]*Amer. Jour. Med. Sci.* Jan. 1910; [7]*Proc. Roy. Soc. Med.* Mar. 1910.

URINE, EXAMINATION OF. *Francis D. Boyd, M.D.*

Ammonia.—The importance of the estimation of ammonia in the urine is recognized, but the difficulty in clinical work has always been the complicated chemical methods necessary for accurate results. To obviate this difficulty the formalin method was introduced, but the end-reaction in the titration, on which the accuracy of the observation must depend, was found to be so wanting in sharpness as to render accurate work impossible. To overcome this defect, E. W. Brown[1] has introduced a modification which it is claimed gives a sharp end-reaction and accuracy. The technique of the modified method is as follows: About 60 cc. of filtered urine are treated with 3 grams of basic lead acetate, well stirred, allowed to stand a few minutes, and filtered. The filtrate is treated with 2 grams of neutral potassium oxalate, again well stirred and filtered. Ten cc. of the clear filtrate are diluted to about 50 cc. with distilled water, and a few drops of 1 per cent phenolphthalein added. The fluid will be slightly alkaline or acid solution: more frequently the latter. Fifteen grams of neutral potassium oxalate are added, thoroughly stirred, and the specimen exactly neutralized with one-tenth normal sodium hydroxide or sulphuric acid; 20 cc. of 20 per cent commercial formalin, previously made neutral, are added, and the solution again titrated with one-tenth decinormal sodium hydroxide. Every cubic centimetre of one-tenth normal sodium hydroxide corresponds to 0·0017 gram ammonia. The burette reading of the second titration multiplied by this factor represents the amount of ammonia in 10 cc. of urine. The quantity is then calculated on the basis of the twenty-four-hour volume.

The method should commend itself to the practitioner on account of its simplicity; an estimate can readily be made in duplicate in ten minutes.

Levulosuria.—The significance of alimentary levulosuria in the diagnosis of hepatic insufficiency is based upon the observation of Hans Sachs, that the liver alone is able to convert levulose into glycogen. Strauss further showed that 100 grams (3 oz.) levulose is readily dealt

with by the normal individual, no trace of it passing into the urine. The application of the test is simple. The urine of the patient is examined for sugar. In the morning the bladder is emptied, and the fasting patient is given 100 grams levulose dissolved in water or weak tea. A specimen of the urine is then obtained every hour till four specimens are taken. The urine is examined by the resorcin test, Fehling's test fermentation, and the polariscope. Hamilton[2] finds the test positive in a high percentage of cirrhosis cases. It may be considered as determining the presence of cirrhotic processes when passive congestion is the chief clinical feature. It is suggested that the test should be carefully considered in its relation to malignant disease associated with jaundice. Like all other biochemical tests, this can be of use only when the whole case is considered. It is suggested that it is justifiable to diagnose "hepatic insufficiency" when the test is positive.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* Dec. 1909; [2]*Montr. Med. Jour.* July, 1910.

UTERUS, DISEASES OF.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

Pelvic Pain.—Herman,[1] in an address on the gynæcological difficulties of the general practitioner, lays special stress on the symptom of pain in the lower abdomen with or without local disease in the pelvis. He states that local pain may produce neurasthenia, and that neurasthenia may produce symptoms referred to the pelvis. A local condition, concerning which a strong woman would not trouble herself, may make the life of a neurasthenic person miserable. It is, therefore, often difficult to say how much of the pain is due to the local disease, and how much to weakness of the central nervous system. He deprecates strongly the abuse of the curette in cases of pelvic pain, and quotes Matthew Duncan's opinion that endometritis capable of recognition by the ordinary criteria of inflammation is comparatively rare. He particularly points out that the scrapings removed by the curette from cases of so-called endometritis rarely show pathological changes. Neurasthenia is usually a disease due to the strain of unsuitable education. "We mistake a barren knowledge of facts for education." A girl whose nervous system has been reduced to this state of irritable weakness will be made worse by menstruation, the worries of marriage, and the anxieties of child-rearing. In any of these circumstances there may be local symptoms without local disease, which any number of pessaries or scrapings will not benefit. On the other hand, a robust woman may become neurasthenic as the result of a chronic pain-producing condition of the pelvis. These cases are cured when the local disease or displacement is remedied.

Herman distinguishes from neurasthenia the condition "psychasthenia," in which a somewhat similar condition of the nervous system is due to inherited mental instability. Hysteria differs from neurasthenia in that the sufferer exhibits a diminution of sensibility, not

only in certain paths of common or special sensation (hysterical stigmata), but in the fact that her actions in general are uninfluenced by the opinion and example of the world round about her. In regard, however, to the reception of certain stimuli, both physical and mental, her nervous centres may be unusually responsive. Thus, while indifferent to what Meredith called "the pressure of the impalpable," and Mill "the force of public opinion," she can be violently influenced by direct obtrusive definite suggestion.

The author concludes a most interesting paper: "In cases of pelvic pain it is most important, generally easy, but sometimes very difficult, to distinguish between that which is hysterical, and curable by suggestion; that due to neurasthenia, curable by rest and sleep; that due to psychasthenia, benefited by rest and sleep, but not curable by anything; and that due to local disease, to be cured by local treatment."

Myomata.—Haultain[2] discusses some points in the life history of these tumours. They occur with equal frequency in the married and unmarried. He does not consider that sterility is a stimulus to their growth. From nearly 500 cases in his own experience he concludes that fertility is much impaired by their presence. Pregnancy has a stimulating effect on their growth, and they usually remain permanently larger after its completion. The complication of pregnancy is fraught with danger, for, in the author's personal cases of this conjunction, the operative mortality was 15 per cent, as compared with 2 per cent in cases not so associated. Thirty-four per cent of all the tumours in his series exhibited degeneration of some kind or other, but only twice was sarcoma noted. One of the most striking characteristics of uterine myomata is the frequency with which they delay the menopause. On one occasion he operated on a patient of sixty-one, in whom it had not been reached. From his observations, myomata tend towards atrophy and quiescence after the menopause, but the period immediately preceding this is the one most fraught with the risks of degenerative change. It has been stated that one in every five women are found post mortem to have myomatous nodules in their uterus. If this be so, a very large number never grow to any size or assume morbid characters. He therefore considers they should only be operated on when giving rise to symptoms. To await the menopause is too indefinite now that the risks of their removal are so small. On the other hand, when small and giving rise to no symptoms, they should be let alone, for the chance of future trouble is not great, and can be well dealt with if it arises; a 2 per cent risk is worth running when benefit is to be attained but not on the chance of avoiding possible trouble.

The views of Haultain are those commonly accepted by gynæcologists. It may be remarked that the number of these small tumours giving rise to no symptoms which are met with in practice is small, for obviously the possessors of them do not require to consult a doctor.

A. J. Wallace,[3] writing on the same subject, contributes observations on ten cases of uterine myomata, watched over periods varying from three and a quarter to twenty-eight years. The patients were seen

from time to time, and the size of the tumours carefully noted. Of the ten patients, two had fair health up to the time of the menopause, and two moderate. Spontaneous disappearance of the tumour was noted in two cases. Four cases remain alive in conditions of chronic invalidism, and one died after a long period of ill-health and suffering. He remarks that his recital is a serious indictment of the application of palliative measures, and indicates that where these tumours are giving rise to symptoms, and the patient's condition is sufficiently good, removal is the proper course.

Munro Kerr[4] has found malignant disease of the uterus complicating myomata in that situation nine times out of two hundred cases operated upon by him. In six the superimposed disease was shown to be columnar-cell carcinoma of the corporeal endometrium, in two round-cell sarcoma, and in one carcinoma of the cervix. His results are supported by the observations of others; thus Noble found carcinoma of the corpus in 2·4 per cent, and sarcoma in 1·5 per cent; Macdonald, in 2·9 per cent and 1 per cent; and Haultain in 4 per cent and 1·7 per cent. In general, malignant disease, beginning either in the tumour or endometrium, occurs in 5 per cent of all the cases. As a rule, malignancy does not develop until the fiftieth year is reached. As the mortality of hysterectomy for myomata is not more than 2 per cent in the hands of skilled operators, the chance of a fatal result from the operation is much less than that of malignant disease supervening if they are let alone.

Carcinoma.—Speaking at the fifteenth International Congress of Medicine, Wertheim[5] stated that he had operated by his method on 487 cases of carcinoma of the cervix, of which 200 were performed more than five years ago. (For illustrated description see *Medical Annual*, 1906.) Of these latter, the mortality was 24·5 per cent, and the number of absolute cures 19·3 per cent, i.e., the number of patients living after five years out of 100 presenting themselves for advice. In his last 200 operations the mortality had fallen to 10 per cent, with an operable rate of 60 per cent. Dirner, with an operability rate of 63 per cent, had a mortality of 15 out of 80 cases. Zweifel attached much importance to the removal of the regional glands, and for this reason favoured the abdominal operation.

Schauta,[6] who practises an extended vaginal operation for carcinoma of the cervix, claims an absolute percentage of cures of 13·4 out of every 100 patients presenting themselves for advice. His mortality rate is 10·7 per cent. He believes the operation associated with his name to be superior to the abdominal method of radically extirpating the disease.

During the past year a large number of radical operations by the abdominal route after the method of Wertheim have been performed by British gynæcological surgeons, for the cure of carcinoma of the cervix, and the operation is steadily gaining ground. Schauta's operation has been less frequently practised. The ultimate results of these operations will not be forthcoming until the period of five

years requisite to establish a "complete cure" is past. Everything, however, points to the likelihood of simple vaginal or abdominal hysterectomy being given up in the treatment of this disease except in early cases, where by reason of extreme weakness on the part of the patient the radical procedure would not be borne.

The PALLIATIVE TREATMENT of carcinoma of the uterus has been the subject of two interesting papers published in America. Chase[7] refers to the results published by Byrne on the effects of radical extirpation of the disease by the **Thermo-cautery.** His figures were remarkable, in that out of 367 patients operated on by him he claimed no less than 19 per cent still alive at the end of five years. Chase reported four cases so treated, in two of which growth had not returned. One of these two, it should be noted, had also hysterectomy performed.

Boldt[8] has treated many patients by the cautery, and, whilst he has had no actual cures, he has seen many whose lives were prolonged for three years or more.

Acetone has been praised by Gellhorn[9] in the treatment of inoperable carcinoma of the cervix. This substance is a tissue-fixative of great penetrability. Gellhorn applies it through a tubular speculum after the growth has been thoroughly excavated with the curette. It is allowed to remain in contact with the tissues for from fifteen to thirty minutes, and its application should be repeated every two or three days.

The subject of the palliative treatment of carcinoma of the cervix is an important one. There can be no doubt that the use of the cautery is followed in many instances by a marked retardation of the disease, and the loss of blood and the fœtid discharge are diminished for a while, or cease altogether. The results claimed by the late J. Byrne have, however, never been attained by other operators. A number of cases have been so treated at the Chelsea Hospital for Women. In some, marked improvement has followed, partial healing by granulation being observed. In others, however, especially young women with the fungating type of growth, rapid return of the mass has occurred, necessitating a repetition of the cauterization.

Acetone undoubtedly effects a great cleaning of the growth, but in the writer's experience it is followed by a good deal of pain, and later by increased hæmorrhage. Its chief use would appear to be in cases on whom the modern radical operation is in contemplation, with a view to rendering the parts aseptic beforehand. In frankly inoperable cases it is inferior to the thermo-cautery. In the use of the latter, thoroughness is important. All the friable portion of the tumour should be scraped away down to firm tissue, and the burning should then be extensive and deep, care being taken to avoid perforation of the bladder.

Uterine Hæmorrhage.—Victor Bonney,[9] writing on the diagnosis and treatment of hæmorrhage from an unenlarged uterus, divides the cases into those associated with a definite pathological condition, such as small myomata, polyps, or uterine fibrosis, and those in whom no pathological condition can be discovered. In regard to the former the

diagnosis has first to be made ; in some cases this is only possible after dilatation of the cervix. The second group comprises a number of types, such as menorrhagia of puberty and the menopause, post-lactitional hæmorrhage, and certain apparently causeless forms of bleeding suddenly intercalated in the course of the normal menses. The age of the patient must be taken into account. If she is below thirty, carcinoma is almost to be excluded. Between thirty-five and forty-five years of age the likelihood of a definite pathological lesion is greatly increased. After fifty, hæmorrhage from the uterus is very suggestive of malignant disease. If the abnormal bleeding regularly recurs with each menstrual epoch, or is continuous, a gross physical alteration of the uterus is probable ; where it is irregular, spasmodic, and counterbalanced by periods during which the menses are normal, a functional cause is more likely.

An important question is whether, in the event of a diagnosis by ordinary investigation being impossible, it is justifiable to try the effect of drug treatment before resorting to operative measures. The answer to the question is usually not difficult, and is founded on a consideration of the age of the patient and the character of the bleeding. The significance of uterine hæmorrhage becomes increasingly grave as age advances, because the liability to neoplasms increases as the years go by. Menorrhagia, other things being equal, argues a less severe lesion than metrorrhagia, and intermittent hæmorrhage of all kinds is of less import than continuous loss. Where youth, menstrual incidence, and irregularity of occurrence all point towards a functional cause, drugs should always be given a good trial. On the other hand, advanced years and continuous loss form an urgent danger signal, and no time should be lost in exploring the uterus under an anæsthetic and ascertaining the cause of the bleeding.

Disease of the Large Intestine Simulating Affections of the Uterus and Adnexa.—Munro Kerr[10] has written a paper remarking on the frequency with which tumours of the large intestine simulate affections of the female genital organs, and reports five cases in support of his views. These consisted of : (1) Carcinoma of the sigmoid, simulating an ovarian tumour ; (2) Malignant disease of the rectum, resembling a uterine myoma ; (3) A cyst of the left ovary with carcinoma of the sigmoid, resembling extra-uterine pregnancy ; (4) Tuberculous disease of the cæcum, simulating an ovarian tumour ; (5) Chronic inflammation of the appendix and cæcum, simulating a uterine myoma.

This paper forms an interesting companion to that published by the present writer last year and referred to in the *Medical Annual* of 1910. Therein I described five similar cases treated, like Munro Kerr's, by resection and anastomosis. Munro Kerr pertinently refers to the present position of the gynæcological surgeon in this country, and remarks that it will be necessary in the near future to extend the scope of his work to the larger field of general abdominal surgery. With his views I am in entire agreement. The principles underlying the technique of abdomino-pelvic operations are identical with those of the

abdomen at large, and the old-fashioned custom which restricted the gynæcologist to the genital organs has not only been disadvantageous to many patients in the past, but is illogical, nay impertinent, in the present day, when amongst the gynæcological operations are to be numbered the most formidable in the whole category of surgery. This extension of the operative field is already established in America, and is now in progress amongst the younger gynæcological surgeons of this country.

REFERENCES.—[1]*Brit. Med. Jour.* Jan. 22, 1910, p. 181 ; [2]*Edin. Med. Jour.* Aug. 1910, p. 133 ; [3]*Brit. Jour. Obst. and Gyn.* July, 1910, p. 20 ; [4]*Brit. Med. Jour.* Jan. 8, 1910 ; [5]*Brit. Jour. Obst. and Gyn.* Nov. 1909, p. 347 ; [6]*Ibid.* p. 348 ; [7]*Jour. Amer. Med. Assoc.* Dec. 4, 1909 ; [8]*Ibid.* ; [9]*Pract.* June, 1910, p. 778 ; [10]*Glasg. Med. Jour.* July, 1910, p. 17.

VACCINIA. *E. W. Goodall, M.D.*

A case of this affection occurring accidentally in a farmer, aged thirty-eight, is reported by R. W. Cruickshank.[1] The seat of the lesion was the right lower eyelid. It began as slight irritation, redness, and swelling. A small elevated papule then formed, which gradually increased in size, and as it did so became flattened and dark-coloured on the top. A ring of minute vesicles then formed upon the raised surface. There was a good deal of surrounding inflammation and swelling. Finally, a scab, 2 cm., by 1 cm. formed, from beneath which a sero-purulent fluid exuded. The scab separated, leaving a small granulating surface. It was two months from its commencement before the lesion was finally healed. The patient had been vaccinated in infancy. He, together with one of his children, an unvaccinated infant of three months, was vaccinated after the sore on the eyelid had healed. Three other infants were vaccinated with the same lymph. In the cases of the four infants the vaccination was successful ; but in the case of the man there was no result.

REFERENCE.—[1]*Brit. Med. Jour.* Apr. 23, 1910.

VAGINA AND VULVA, DISEASES OF.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

Leucoplakic Vulvitis.—Comyns Berkeley and Victor Bonney[1] have published the results of a research extending over some years on the subject of leucoplakic vulvitis and its relation to the condition known as kraurosis vulvæ and to carcinoma of the vulva. Leucoplakic vulvitis is a not uncommon disease, occurring usually in women over forty. In a typical case the vulval surface is whitish in colour, owing to great thickening of the epithelium. This change extends over the inner sides of the labia major, to their junction behind the vaginal inlet, both surfaces of the labia minor, and the clitoris, and in some cases extends outwards even as far as the thigh, and backwards around the anus. Its distribution is symmetrical. The introitus vaginæ and the surface of the vestibule around the urinary meatus are not affected. In advanced cases the labia minor, though thickened, are retracted, so that these folds in time disappear, and the hood of the

clitoris suffers the same fate. Painful cracks and excoriations are often present.

The leading, and often the only symptom, is incessant pruritus, extending over many years. When cracks or excoriations are present, much soreness and tenderness may be complained of as well.

The cause of the disease is unknown. Histologically, in the early stage a diffuse lymphocytal infiltration of the sub-epithelial tissue can be demonstrated. Subsequently fibrosis occurs, with disappearance of the yellow elastic fibres. The epithelium then begins to thicken, at first downwards in long papillary processes, and later by increasing surface deposit of intensely keratinized squames which give rise to the typical white appearance.

The relation borne by the disease to carcinoma of the vulva is remarkable, in that out of a large number of cases of the latter condition there was not one that did not also exhibit the changes due to leucoplakic vulvitis, whilst the supervention of malignant disease on the chronic inflammatory affection has been watched by the authors on several occasions. The liability to malignant transformation is greatest when the hypercellularity of the connective tissues and the abnormal activity of the epithelial cells coincide. This phase safely passed, a regression occurs in which subepithelial fibrosis co-exists with an everlessening growth power on the part of the epithelium. Clinically, carcinoma begins most commonly at the site of one of the painful cracks or excoriations. It may be warty or ulcerative, or exhibit a diffuse surface growth resembling eczema. The inguinal glands are affected after a while, and rapidly enlarge and break down.

The authors also draw special attention to the distinction between leucoplakic vulvitis and kraurosis vulvæ. The latter condition was first described by Briesky, and is characterized in its early stage by a number of painful red areas in the vestibule and around the meatus and vaginal introit. The carunculæ myrtiformes are particularly affected. Retraction with atrophy occurs, affecting chiefly the vaginal introit and the labia minora, and the mucous membrane becomes thin, pale and shiny, and the colour of goose liver. The leading symptom is dyspareunia, first on the side of the sufferer, but later, as retraction occurs, common to both parties. In the earlier stages much soreness is complained of, and in many cases the meatus urinarius is carunculous.

The disease, histologically and clinically, has no relation with leucoplakic vulvitis, though in the past the two conditions have been confused with one another, nor is it liable to carcinomatous transformation.

The diagnosis of leucoplakic vulvitis is very easy on account of its typical appearance. There are other causes of pruritus, notably glycosuria, and every patient should have her urine carefully tested for sugar before the diagnosis is absolutely decided on.

Carcinoma of the vulva may be difficult to diagnose in its initial stage. Its warty form may at first look so superficial and discrete as to be mistaken for a simple papilloma. The form characterized by

diffuse surface ulceration may also be misinterpreted. Any ulceration or warty nodule on a vulva the seat of leucoplakia should be viewed with suspicion.

In the TREATMENT of leucoplakic vulvitis a large number of applications have been tried to alleviate the intense itching. Of these, "**Zymocide**" lotion and "**Resinol**" ointment have proved most successful. Exposure to **X-Rays** relieves to an extent, but in view of the liability to carcinomatous transformation, this treatment is not altogether without risk of precipitating this catastrophe.

In intractable cases, making the patient's life miserable, or when painful fissures suggestive of beginning carcinoma are present, the best course is excision of the affected parts. If carcinoma has already appeared, the inguinal glands must be removed as well. It is important to remove the entire leucoplakic area in these cases, for the authors recorded a case where malignant disease started *de novo* on a portion of leucoplakic tissue left after excision of a vulva for carcinoma with leucoplakia.

NOTE.—Since the above paper appeared, Mr. Cecil Lyster has treated several cases by **Zinc** and **Mercury Ionization.** The results of this method up to now have been more satisfactory than anything yet tried.

Artificial Vagina by Intestinal Transplantation.—Under the above title J. F. Baldwin[2] describes an ingenious operation devised by him for cases in which the vagina is congenitally absent. In the past these cases have been very difficult to treat. Various methods of making a vagina have been tried, chiefly by tunnelling up to between the rectum and bladder, and endeavouring to keep the new passage patent until its surface has become covered by epithelium, either by ingrowth from the exterior or by artificial epithelial implantation. The results of such attempts have been very poor, the artificial passage rapidly contracting and being useless for its specific function, and most surgeons have abandoned the attempt to correct the deformity.

Baldwin's operation consists essentially in transplanting a piece of the ileum between the bladder and rectum. The technique is as follows: With a sound in the bladder and the index finger in the rectum a transverse incision is made across the perineum at the site of the proposed vaginal entrance. The dissection is carried upwards until the peritoneum is reached and the passage is then plugged with gauze over a long pair of forceps. The abdomen is then opened, and a coil of ileum close to the ileo-cæcal valve pulled up. The coil is then resected, but with careful preservation of its mesentery, and its two open ends are closed by suture. The deficiency in the continuity of the bowel is then repaired by end-to-end anastomosis.

The peritoneum over the passage previously tunnelled between the rectum and bladder is now opened, and by means of the forceps in it the isolated loop of ileum is seized by its middle, and the two limbs are drawn into the position of the new vagina. The peritoneum

over it is then sutured so as to exclude the closed ends from the peritoneal cavity, and the abdominal wound is then closed. The patient is then again placed in the lithotomy position, and the knee of the loop is opened, and the cavity of either limb is packed with gauze so as to keep them pressed against the new vaginal bed. The edges of the opening are then stitched to the edges of the perineal incision. Some weeks later a second operation is undertaken, and the septum between the two limbs is removed.

The results of this operation have been excellent in Baldwin's hands, and it would appear to solve what, up to now, has been one of the most troublesome problems in gynæcological surgery.

REFERENCES.—[1]*Brit. Med. Jour.* Dec. 18, 1909; [2]*Jour. Amer. Med. Assoc.* Ap. 23, 1910.

VINCENT'S ANGINA. *E. W. Goodall, M.D.*

This ulcero-membranous inflammation of the tonsils is the subject of a paper by J. D. Rolleston,[1] who gives the following summary: (1) Vincent's angina is an uncommon disease, occurring in 0·9 per cent of all cases of sore throat and in 4·9 per cent of cases of non-diphtheritic angina. (2) During a five years' period of observation in a hospital population of all ages, the affection was confined to children between two and sixteen years. (3) No instances of contagion were observed. (4) Its incidence was greatest in the spring, least in the autumn. (5) It was not found to show any predilection for weakly children or for cases of oral sepsis. (6) There is nothing characteristic in its prodromal symptoms. (7) There are not two distinct varieties of Vincent's angina: the ulcerative is merely a later stage of the membranous form. (8) Constitutional symptoms are slight or absent, but the local affection is more pronounced than in diphtheria. (9) Association with other diseases is uncommon. (10) The prognosis is favourable. Complications are infrequent and usually insignificant. (11) Treatment consists in the local application of **Tincture of Iodine** or **Methylene Blue** powder. Internal medication is usually unnecessary.

In contradistinction to the third of the points given above, the account by F. Fraley[2] of an outbreak of the disease in an institution for children at Philadelphia is interesting. There were nine cases. The spread of the disease from one child to another was attributed to the common use of a tumbler, kept alongside of a water-cooler, to which the children could go when thirsty and help themselves.

E. W. Goodall, in the same volume of the Metropolitan Asylums Board's report in which Rolleston's paper is published, gives an account of a fatal case of ulceration of the larynx complicating post-scarlatinal nephritis, in a young man aged twenty-one. Smears from the ulcers showed Vincent's organisms, while those from the ulcerated gums (the patient was also the subject of severe gingivitis) failed to show them.

REFERENCES.—[1]*Metrop. Asylums Board Rep.* 1909, p. 238; [2]*Jour. Amer. Med. Assoc.* May 7, 1910.

VISION, DEFECTS OF. *A. Hugh Thompson, M.D.*

The principal troubles that refractive and muscle-balance errors produce, says Doyne,[1] may be divided roughly and somewhat artificially, into peripheral and central conditions. Of the former, pain at the back of the eyes is one of the commonest complaints. This is a definite symptom due in almost all cases to strain of the ciliary muscles, and therefore common in hypermetropia. Another less common peripheral symptom is pain at the nape of the neck, which is very often associated with disturbance of muscle balance (heterophoria). These and other peripheral pains are generally felt in the area of distribution of the fifth nerve. Functional troubles of central origin include headache, sickness, sleepiness, migraine, and—a symptom generally missed—polyuria. The importance of astigmatism in producing these symptoms is, in Doyne's opinion, often exaggerated. By far the commonest cause is anisometropia, and the explanation is the strain on the fusion centre of the brain which must exist in these cases. The adjustments necessary for binocular vision are far more complicated than those for monocular, and when an extra complication is introduced by the existence of inequality in the two eyes, the effort to procure it may easily result in these central symptoms. When, on the other hand, the effort is frankly abandoned and only monocular vision is attempted, the symptoms no longer arise. A proof of this is the fact that the one-eyed largely escape these functional troubles. There must be somewhere in the brain a focussing centre for each eye, and there must also be a fusion centre for the conversion of the two images into a single impression. Refractive errors, including astigmatism, act as a strain on the focussing centres separately. Anisometropia acts as a strain on the fusion centre, and is apt to cause greater trouble.

Treatment.—The paper should be read as a sane protest against the practice of making patients wear glasses when there is really not sufficient cause for doing so. In cases of hypermetropia of less than 2 D in young people, it is certainly not necessary to assume that glasses must be worn always, or even for near work. The functional symptoms are due in most cases to some temporary cause which lowers the tone of the ciliary muscle, and though it may be necessary to help the accommodation temporarily, the attention should be directed in the main towards improving the patient's general health. It cannot be too loudly or forcibly proclaimed, says Doyne, that in functional troubles the treatment that should be adopted is not rest but exercise. What degree of astigmatism in children calls for correcting glasses is a question not tackled, but the present writer would put it at anything over 1 D as a good working rule, though here, as everywhere else, each case must be judged on its merits. In cases of astigmatism, says Doyne, glasses if worn at all should be worn constantly, and the same is true of glasses which correct anisometropia. Thus, in the case of a presbyope who has never worn glasses, but whose eyes are unequal or astigmatic, Doyne recommends that unless glasses are to be worn

for distance as well as near, it is good practice to ignore everything but the presbyopia, and simply order the convex glasses which will relieve the ciliary muscles from the extra work due to advancing years. In cases of hyperphoria, prisms, if worn at all, must be worn constantly. Esophoria may cause difficulty in a hypermetropic patient because the stimulus to accommodation that is normally associated with the act of convergence is absent, and therefore these can only be helped either by convex glasses for near, which will relieve the accommodation, or by prisms base out, which will make it easier to call into play the accommodative power that exists.

In prescribing glasses for the correction of headaches, one must not forget that glasses in themselves are a nuisance, and the question must often arise for the surgeon, and perhaps still more often for the patient, whether the game is worth the candle. Cases are of everyday occurrence where undoubtedly it is; but in many cases, where, for instance, a headache only occurs at long intervals, the decision may frankly be left to the patient. On the other hand, in the case of children with affections of the nervous system, such as chorea or epilepsy, the removal of eye-strain by appropriate glasses ought always to be considered as one of the essential points in treatment. Myopes rarely suffer from these functional troubles, but the constant wearing of full correcting glasses is important for them for another reason, as the best known method of checking the tendency of myopia to increase.

REFERENCE.—[1]*Brit. Med. Jour.* Aug. 13, 1910.

VOLKMANN'S CONTRACTURE. *Priestley Leech, M.D., F.R.C.S.*

Several papers have appeared on this subject. Rowlands[1] describes two cases. The condition is an avoidable one, and is due to too tight splinting, in fractures either of the forearm or the elbow; and the anterior splint in fractures of the elbow joint seems to be more liable to cause it than other splints. As to pathology opinions differ; some consider that a myositis is the sole condition present, others think that in some cases the nerves are involved. Ginsburg[2] and Binet[3] have also written papers on the subject. There is, however, no difference of opinion as regards the treatment. Three methods have given good results:—

1. In mild cases the method devised by Mr. Robert Jones[4] is successful. The wrist is flexed to the full, thus allowing the fingers to become extended, and a splint of zinc or sheet iron is then fixed to the dorsum of each finger to maintain the extension. The metacarpophalangeal joints, which are then flexed, are gradually and frequently extended both passively and actively, until, after a few days, the posterior splint can be applied from the wrist to the tips of the fingers, to maintain the extension of the fingers and metacarpophalangeal joints. To allow this the wrist becomes flexed. Active and passive extension of the wrist is now performed regularly and persistently. Then a splint extending from the elbow to the tips of

the fingers is applied, and its shape is altered at intervals, so that by degrees the wrist is fully extended. For some weeks this position is maintained, until all contractile elasticity is lost. The splints are then removed and the hand massaged.

2. In more severe cases, tendon-lengthening may be done, but it is a difficult operation.

3. Excision of portions of the radius and ulna is an easier and better method. It is important to remove enough bone; the removal of about an inch is usually necessary, and the bone should be excised at different levels in the ulna and radius, to prevent any possibility of cross union or limitation of rotation from narrowing of the interval between the bones. After the operation, massage, electricity, passive and voluntary movements, are all necessary, and these should be continued for at least a year.

REFERENCES.—[1]*Guy's Hosp. Gaz.* Mar. 5, 1910; [2]*Amer. Jour. Med. Sci.* Oct. 1909; [3]*Rev. de Chir.* Ap. 10, 1910; [4]*Amer. Jour. Orthop. Surg.* Ap. 1908, p. 6.

VOMITING. (*See also* SEA-SICKNESS.) *Robt. Hutchison, M.D.*

Snowman[1] divides cases of vomiting into three groups: (1) *Local*, (2) *Toxic*, (3) *Reflex*.

1. *Local*.—This group includes all those instances where the vomiting is explained by local conditions within the stomach. There may be deficient functional activity as in acute fevers, or a catarrhal condition may prevent the efficient discharge of the digestive process. The catarrh may be primary, or it may be associated with gastric ulcer or cancer; it may be a symptom of alcoholism; it may be incidental to phthisis, or to disease of the heart or liver.

2. *Toxic*.—This comprises all those morbid states wherein a toxæmia is either known or assumed to exist. The toxic substances of the blood directly irritate the vomiting centre in these cases. This is clearly seen in the vomiting which often accompanies the invasion of acute specific fevers; it is evident also in post-anæsthetic vomiting, Addison's disease, and in the cyclical or pernicious vomiting of children; in actual practice, however, its most frequent occurrence is in renal disease.

3. *Reflex*.—This group embraces the vomiting of cerebral origin, of labyrinthine disease, of the pain of visceral disease generally, including such conditions as hernia and intestinal obstruction. The vomiting of pregnancy should probably come into this group. Closely allied to it is the vomiting of pertussis and other diseases where there is cough of a paroxysmal character, particularly bronchiectasis. The vomiting centre is situated in close proximity to the respiratory centre, and irritation of the latter is very liable to extend to the former and cause vomiting.

TREATMENT.—The first point to determine is, whether the vomiting is an incidental symptom of an acute illness or a cardinal feature of some chronic disease. The routine of treatment in the two cases is

quite different. In typhoid fever or in pneumonia, there may be troublesome vomiting even on an exclusive milk diet; but this symptom is not of the essence of the disease, and Snowman is confident that an abatement in the severity of the primary trouble will witness a cessation of the vomiting. It is therefore quite permissible to resort for a few days to what practically amounts to **Starvation,** until by means of veal-tea, chicken-tea, or various meat-extract preparations, the stomach recovers some functional power, as indicated by the assertion of an appetite. This method of starvation is often disguised as feeding. Obviously it can only be a very temporary measure, and if it is not successful, in a disease like typhoid fever the nutrition of the patient becomes seriously compromised. In chronic diseases it is quite clear that this method has no room at all.

The ordinary therapeutic measures available are very numerous and somewhat conflicting in their variety, a testimony to the failure which so often attends their exhibition. Nausea may be relieved occasionally, either by sips of extremely **Hot Water** or by sucking fragments of **Ice.** This contrast is still further seen in the circumstance that sometimes a tight abdominal binder will stop nausea, whereas at other times this unpleasant sensation yields when the clothing around the abdomen is loosened. Perfect recumbency in the horizontal position should be maintained, and such local applications to the epigastrium as sinapisms, blisters, or leeches are frequently very useful. The washing out of the stomach with weak **Boric Lotion** or alkaline solutions is an excellent method of treating the persistent vomiting in gastric dilatation or the gastric catarrh of infants.

The favourite drug is **Bismuth** in one of its various forms. This is an excellent remedy when the vomiting results from gastric irritation, but in other circumstances little is to be expected from it. The carbonate should be chosen in preference to the subnitrate, because the latter is liable to become converted in the intestine into the nitrite, and produce toxic symptoms. Another disadvantage of prescribing the subnitrate is that the mixture containing it usually has bicarbonate of soda as one of the ingredients, and the interaction of these two substances may lead to the evolution of sufficient carbonic acid to force the cork out of the bottle. **Cerium Oxalate,** which is official in the United States Pharmacopœia, probably acts in the same way as bismuth, but nothing definite is known of its pharmacology. It has acquired a reputation in the treatment of the vomiting of pregnancy, but clinical experience generally fails to confirm it.

Creosote, Iodine, and **Carbolic Acid** may be grouped together as a series of drugs which allay vomiting when suitably employed. Cases of fermentative action in the stomach would appear to be beneficially influenced by their use, and the vomiting accompanying this condition abates because these drugs relieve the cause of this symptom. But it must be remembered that both creosote and carbolic acid have a local anæsthetic effect, and this may, in some measure, explain their anti-emetic virtue. The use of drop doses of tincture of **Iodine,** well

diluted in water, is a purely empirical measure which succeeds less often than it fails. The same must be said for **Vinum Ipecacuanhæ,** which is credited with success in the treatment of the vomiting of pregnancy when given in homœopathic doses. Tincture of **Hydrastis** is another preparation which has gained special praise for the same condition. A drug still less frequently used for vomiting is **Orexin Tannate.** This is recommended for the vomiting after opium, chloroform, or other narcotics. The dose is from 5 to 12 gr., and it should be given two hours before meals.

Aconite has some vogue in the treatment of vomiting, but it must be given in large doses. It then numbs the reflex centres and acts as a powerful sedative to the peripheral nerves in the gastric mucous membrane. It is one of the host of drugs suggested for the vomiting of pregnancy. **Chloretone** is really an effective remedy when some painful local disease, such as cancer of the stomach, is responsible for the vomiting. In doses of from 5 to 8 gr. it relieves pain to a considerable degree, and permits the stomach to tolerate a certain amount of food. One-third of a grain of **Cocaine** will occasionally put a sudden stop to a bout of vomiting, and is one of the most effective remedies available for sea-sickness. **Hydrocyanic Acid** is another drug with a reputation in gastric vomiting; but if it acts it does so forthwith, and if it proves to be unsuccessful at first, it is merely a waste of time to persist with it. On the other hand, in vomiting of reflex origin it is worth while to persist with **Bromide of Potassium,** and, indeed, to give it per rectum if the stomach does not tolerate it. Another drug which may be given by the same route in the form of suppositories is **Opium.** On the whole, opium is our most valuable remedy for vomiting which is persistent and exhausting, and then it must be given in the form of a hypodermic injection of morphine. This drug acts unquestionably as a powerful sedative to the vomiting centre, and it will afford relief as definitely as it does in a paroxysm of pain. For rapid and immediate effect there is no drug to compare with it in the Pharmacopœia.

REFERENCE.—[1]*Lancet*, Mar. 12, 1910.

VOMITO NEGRO OF IQUITOS. (*See* YELLOW FEVER.)

VULVO-VAGINITIS. *C. F. Marshall, M.Sc., M.D., F.R.C.S.*

Whitehouse[1] mentions the suggestion that some cases of endometritis, dysmenorrhœa, and salpingitis occurring in adults may be due to latent uncured gonococcal infection in childhood. Good results have been reported from **Vaccine Therapy.** Butler and Long treated twelve children between the ages of one and a half and twelve years by this method, regulating the dosage by estimation of the opsonic index, and compared the results with those obtained by treating twelve children with argyrol and permanganate of potassium irrigations. In the vaccine cases, gonococci disappeared in ten to twenty-one days in four cases, after several weeks in five cases; the remaining

three cases recurred when the vaccine was left off, but were cured eventually. In the argyrol cases, nine were treated for twenty-five to ninety-six days without cessation of discharge, while the remaining three were cured after several weeks' treatment. Whitehouse has treated two children by vaccines, with good results, the gonococci disappearing after five and six injections respectively. Eight cases were treated by cultures of **Lactic-acid Bacilli** alone, with the result that gonococci and septic microbes disappeared in two or three weeks.

REFERENCE.—[1]*Pract.* Apr. 1910.

WHOOPING-COUGH. (*See* PERTUSSIS.)

WORMS, INTESTINAL, IN CHILDREN. *Prof. G. F. Still, M.D.*

Schloss,[1] as a result of investigations in New York on 280 children between two and twelve years of age, found that 28·5 per cent had worms: 11 per cent showed *Trichocephalus dispar* (whip-worm), 8 per cent *Oxyuris vermicularis* (thread-worm), 7 per cent *Tænia nana* (the dwarf tape-worm), 2 per cent *Ascaris lumbricoides* (the round-worm), and 1·7 per cent *Tænia mediocanellata* (beef tape-worm). The occurrence of *Tænia nana* in children would seem to be very rare in this country, but Schloss[2] elsewhere has reported finding 14 cases amongst 230 children in New York. In 8 of these there were gastric or nervous symptoms, such as epigastric pain, nausea, vomiting, and increased appetite, restlessness at night, grinding the teeth, itching of the nose, and genital pruritus. Where symptoms were produced, eosinophilia was usually present.

GENERAL SYMPTOMS.—Apart from loss of weight and anæmia, Schloss tabulates a large number of symptoms which may be referable to worms of various sorts. The most prominent are the gastro-intestinal and the nervous: amongst the former he mentions nausea, vomiting, abdominal pain, diarrhœa, jaundice either from catarrh of the duodenum or from mechanical obstruction of the bile duct, sensations of sinking or emptiness in the abdomen, disturbances of appetite, and very rarely intestinal obstruction. Jaundice is more likely to be associated with round-worms than with other parasites, but has been seen with tape-worm. The nervous symptoms are disturbances of sleep, irritability or nervousness, itching of the nose, dyspnœa, dizziness, choreiform movements, convulsions, and functional paralysis. The organs of special sense are sometimes affected, the senses being perverted more or less; the pupils have shown changes in some cases. Erythema or urticaria is sometimes associated with round- or tape-worms, whilst rectal irritation, vulvitis, enuresis, and masturbation are associated more often with thread-worms.

Blood-changes are found chiefly in cases in which symptoms are produced by the worms, the change being generally an eosinophilia, but this tends to disappear if the infection is of long standing. Schloss found that in healthy children the eosinophile count was rarely above 5 per cent, whereas with thread-worms it was occasionally as high as

7 to 14 per cent, and with *Tænia nana* or *Ascaris lumbricoides* as high as 8 or 9 per cent, in one case of *Tænia nana* 22·6 per cent; with ordinary *Tænia mediocanellata* it varied from 7 to 13 per cent, but the eosinophilia is very inconstant. Charcot-Leyden crystals are often found in the stools when worms are present; these crystals are thought to be derived from the eosinophile cells.

Treatment.—Schloss insists upon the need for prolonged treatment in the case of thread-worms. **Intestinal Irrigations** with salt water, quassia, or garlic, should be given every evening for two or three weeks, then every alternate evening, and finally twice a week. **Santonin** should be given in doses of 1 to 3 gr. with the same amount of **Calomel** for three successive evenings; on the first and third mornings of treatment a cathartic should be given. For the *Trichocephalus dispar* (whip-worm) Stcherbak,[3] in Russia, where this worm would appear to be much more frequent than in England, recommends **Thymol** in doses of 1 to 3 gr. for children daily; this may be given daily for a week, then the treatment is interrupted for five or six days, then resumed for a week. With these doses, which he says may be increased gradually up to as much as 7 gr. if well tolerated, Stcherbak has seen no ill results, but he mentions that other observers with no more than 3 gr. of thymol have produced severe pain in the abdomen and hæmatemesis. The thymol, on account of its burning taste, is to be prescribed in cachets, after the bowels have been well purged, and directly after it has been taken, hot fluid, such as tea, should be freely given, but no food for an hour or two.

For the treatment of round-worms Gockel[4] recommends **Oleum Chenopodii Anthelminthici.** At six to eight years 8 min. is given twice daily, at nine to ten years 10 min. Menthol was added in minute quantity to cover the taste of the drug. This oil seemed to produce intense irritation of the intestinal mucosa in some cases, and occasionally headache; it produces a deep yellow coloration of the urine, as santonin does.

References.—[1]*Amer. Jour. Med. Sci.* May, 1910; [2]*Arch. Pediatr.* 1910, vol. xxvii; [3]*Rev. de Méd.* Aug. 1910; [4]*Münch. med. Woch.* Aug. 2, 1910.

WOUNDS.

Amido-Azotoluol in (*page 7*).

XANTHELASMA. *E. Graham Little, M.D., F.R.C.P.*

Chaufford and Laroche[1] contribute an important study of the causes of xanthelasma. The observation of the association of the palpebral form of this disease with hepatic disorders producing jaundice is an old one whose authority became disturbed on the establishment of the connection between xanthoma tuberosum of disseminated distribution and diabetes. The identity, shown by histological examination, of the two types of xanthoma is no longer questionable, and the explanation of the apparently different associations of jaundice and diabetes offered by these writers is very plausible. They found that in xanthelasma associated with hepatic disorders, the blood showed an excess

PLATE XLIV.

XANTHELASMA PLANUM.

E. Graham Little, M.D.

of cholesterin circulating in it; that the major part of the tumour-formation in xanthelasma is composed of an infiltration of fat containing cholesterin, and that a "pre-xanthelasmic" state is demonstrable in which, before the appearance of tumours, the skin contains an excess of cholesterin; and that this amount varies with the degree of jaundice. The great receptivity of certain points of the skin compared with others is explained by supposing that there is a special (traumatic ?) tendency to this deposit in folds of the skin, just as there is a special tendency to deposit uric acid in gout in certain parts in the form of tophi. In a patient treated with injections of cacodylate, each site of puncture became later a nodule of xanthoma. The association with diabetes is, perhaps, explicable when one considers the frequency of lipæmia in that disease, with notable quantities of cholesterin in the serum. Thus both forms of xanthoma are the index of a more or less profound disturbance of fat-metabolism, and of an increase of cholesterin in the circulating blood, possibly due to some organic or functional disturbance of the pancreas. It follows, therefore, that this condition should be treated by very careful dieting to restrict the amount of cholesterin formed.

Plate XLIV is from a case recorded by me[2] in which a most curious effect, as though the patient was wearing yellow spectacles, was produced. The patient was acutely jaundiced and suffered from cirrhotic disease of the liver, which was much enlarged.

REFERENCES.—[1]*Sem. Méd.* May 25, 1910, p. 241.; [2]*Brit. Jour. Derm.* 1908, p. 27.

YAWS. *J. W. W. Stephens, M.D.*

A. A. Montague[1] describes the lesions of tertiary yaws seen in Fiji. Syphilis is almost or quite unknown. Two types of ulceration occur: (1) A patch of nodules develops on the skin. They necrose and discharge by small openings. As they heal, fresh nodules appear at the periphery, so that in a few months large areas are involved. (2) A raised edge of ulceration advances rapidly, leaving a firm scar behind. Both forms cause great disfigurement, and both may involve the mouth, hard and soft palates, etc. Periosteal nodes are very common. Nodules like those in the skin also occur in the bones, especially in the sternum and calvarium. Actual necrosis of bone is very rare. These various forms yield readily to iodides.

H. J. Nichols[2] has succeeded readily in infecting rabbits with yaws by injections into the testicles. The infection was then transmitted from rabbit to rabbit. The lesions in the testicle resemble those of a syphiloma. Four rabbits were treated with Ehrlich's "**606**," dichlor-dioxydiamidoarsenophenol. The amount injected intravenously was 0·0045 gram, though rabbits will tolerate a dose thirty times as great. All the animals were permanently cured by a single dose. Three monkeys were also cured.

REFERENCES.—[1]*Jour. Trop. Med.* June 1, 1910; [2]*Jour. Amer. Med. Assoc.* July 16, 1910.

YELLOW FEVER. *J. W. W. Stephens, M.D.*

E. A. Vigil[1] has investigated the nature of the ill-famed vomito negro (black vomit) of Iquitos, Peru, and has come to the conclusion that it is identical with yellow fever. This conclusion is based both on the clinical aspect of the case, and especially on the post-mortem appearances, viz., non-enlargement of the spleen; enlargement of the liver, which is of a yellowish coffee-and-milk colour, bloodless, giving only a few drops of blood when cut, and showing all the aspects of the tuberculous liver; characteristic stomach and kidney lesions. *Stegomyia sp.* is the prevalent mosquito at Iquitos.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* Jan. 8, 1910

Part III.—Miscellaneous.

SANITARY SCIENCE, 1910.

By JOSEPH PRIESTLEY, B.A., M.D., D.P.H.,
Medical Officer of Health, Metropolitan Borough of Lambeth.

ANALYSIS OF CONDENSED MILKS.

Mr. F. J. Lloyd, consulting chemist to the British Dairy Farmers' Association, has recently reported on his analyses of a number of samples of condensed milk, both full-cream and machine-skimmed, representing nearly every brand commonly sold in this country. The industry is almost entirely foreign, and the majority of the samples analysed proved to be "machine-skimmed," i.e., milk from which the butter-fat had been separated by machinery. Such a milk is quite unsuitable as a food for infants and children, as will be readily admitted when the composition of mothers' milk is compared with that of a "machine-skimmed" condensed milk, diluted with water in accordance with the instructions on the tin, thus :—

	Woman's Milk *(König)*	Condensed Milk (diluted) *(Lloyd)*
Fat	3·78	0·30
Casein	1·03	2·55
Albumin (soluble)	1·26	none
Sugar	6·21	20·42
Mineral Matter	0.31	0·76

The excess of sugar in the condensed sample is due to cane or beet sugar, added in the course of manufacture, and causes flatulence and colic in infants fed thereon, whilst the small amount of fat and the absence of soluble albumin (the insoluble albumin or casein being in excess) make the food also unsuitable for feeding the young.

As to the cost, the cheapest brand gives 3·3 oz. of condensed skimmed milk for 1d., and 1·6 oz. consists of added cane sugar. The cost works out at 4d. a pound for sugar, and 8d. a gallon for skimmed milk.

Further, some of the tins were found to have contents which were not free from bacteria. In this way, condensed skimmed milk is neither a cheap nor a nutritious food, and is quite unfit for use as food for infants.

CREAM ADULTERATION.

Attention has recently been officially drawn by the Board of Agriculture and Fisheries to a new form of cream adulterant, the object of which appears to be to increase the weight or bulk and colour of the cream. The substance consists of some form of albuminoid matter, which has been worked into an emulsion with milk and water, and its detection in cream is not difficult if regard is had to the ratio between the non-fatty solids and fat, and particularly to the proportion

of proteins in the non-fatty solids. An analysis of the substance gives the following results: Water 83·46 per cent, proteins 11·90 per cent, lactose 1·55 per cent, milk fat 1·26 per cent, mineral matter 1·28 per cent, and boric acid 0·30 per cent.

Two other substances are used at times for concealing the inferior quality of cream, viz.: (*a*) A solution of lime in cane-sugar syrup—to increase the thickness of cream, and this, on analysis, can be detected by the amount of lime in the ash and the presence of cane sugar; (*b*) A solution of lime in cane-sugar syrup and coloured with annatto —to increase the thickness and to improve the colour of the cream, and this, on analysis, can be detected in the same way as (*a*).

IRISH BUTTER.

The results of an important series of analyses of Irish butter have been published during 1910 by the Department of Agriculture and Technical Instruction for Ireland. About 300 samples were obtained from eight creameries, representing the produce of about 8000 cows, giving an annual output of about 800 tons of butter—the samples being taken by the Department's dairy instructors, under whose personal supervision the butters were also made, so that the genuineness could not be questioned. Samples of cream were also obtained and churned in the sample bottles. The method of analysis adopted was identical with that recommended by the Committee on the Butter Regulations, 1903, viz., the Reichert-Wollny standard.

Of the samples, 16·2 per cent gave a Reichert-Wollny number *below* 24, the limit suggested by the Butter Regulations Committee for Pure Butter, and all these samples were taken during the period of November and January, the lowest figure of all (viz. 20·1) occurring in samples taken in December and January respectively. The Department draws the obvious conclusion, viz., that no analyst is justified in condemning a sample of butter, Irish or other, as adulterated, merely on account of its giving a low Reichert-Wollny number, particularly as there is no evidence whatever to show that such butter is necessarily of low quality, however the term "quality" may be defined. All the samples of butter were tested also for water, and the *average* percentage for 137 samples was found to be 13·04—the highest being 16·00 and the lowest 9·65. Suspicion had been cast upon consignments of Irish butter and cream which afterwards proved to have been perfectly genuine, so that the investigation of a Government Department became necessary.

WREXHAM FOOD-POISONING OUTBREAK.

An outbreak of ptomaine poisoning occurred during 1910 at Wrexham, and 107 persons were affected (5 deaths). The source of the outbreak has been traced successfully by bacteriological methods to pork-pies, infected by one of the confectioner's staff, a germ-"carrier"—identical germs being isolated and incubated from the "carrier," from the pork-pies, and also from the blood taken from the heart of one of the victims. The "carrier" was, as usual, apparently in perfect health. The bakehouse in which the pies were made and baked was in a sanitary condition, and the meat from which the pies were made was wholesome and healthy. The pies at the time that they were eaten appeared to be quite good, and there

was nothing unusual in the taste. The gravying used in the pies was made from gelatin, an excellent medium for germs. No chemical poison, such as strychnine or arsenic, was found in the pies, but they were found to contain the paratyphoid B bacilli, which were isolated also, on cultivation, from the blood taken from the heart of one of the persons who died after eating the pies, whilst the blood of several persons, who partook of the pies and afterwards became ill but recovered, gave the agglutination or clumping test peculiar to the paratyphoid B bacillus, one of the group of paratyphoid-enteritidis bacilli, of which another is the well-known enteritidis bacillus (Gaertner). The symptoms of the disease were as usual, viz., abdominal pains, vomiting, purging, collapse, and even death.

The bacteriological examinations included animal experiments (feeding, inoculation, etc.) with guinea-pigs and mice, and the conclusions drawn by the bacteriologists employed in the investigations are worthy of tabulation: (1) The outbreak was caused by the consumption of infected pork-pies; (2) The nature of the infection was the presence of an organism of the paratyphoid-enteritidis group; (3) The specific organism was the paratyphoid B; (4) The infection took place at the bakery; (5) The probability is practically conclusive that the outbreak had its origin in the head cook (a "carrier" of the paratyphoid B germ). In connection with the person who died, and whose heart's blood showed the paratyphoid B bacillus, three persons (relations), who attended upon her during her illness, caught the disease by contact, and one died. Not one of these three persons in attendance had eaten of the pies, but the symptoms from which they suffered were clinically indistinguishable from those shown in the cases of those persons who had partaken of the pies, and, further, samples of their blood showed, on bacteriological examination, distinct agglutination or clumping reactions.

FEEDING EXPERIMENTS WITH BOVRIL.

During 1910 the Local Government Board for Ireland have had carried out at the School of Physiology, Trinity College, Dublin, a series of physiological experiments as to the nutritive value of bovril. Dogs (first brought to a constant weight on dried dog-biscuit mixed with a known quantity of water) were fed with bovril, with the result that the dogs increased in weight, viz., ten to twenty times the weight of bovril given. When the bovril was discontinued, the animals fell back to the original weights. Control experiments were carried out at the same time with hard-boiled white-of-egg feeding, with the result that the animals gained weight also, but not to the same extent, viz., only $\frac{1}{8}$ to $\frac{1}{10}$ as much with white of egg (hard-boiled), or, taking the dried organic solids in the two foods, from two and a half to four times as much egg-white as bovril was required to produce the same increases.

In the experiments with bovril, too, it was noticed that there was an increased utilization of other foods as well as, in some instances, a retention of reserve nitrogen. In other words, bovril is of direct and indirect value from a nutritive point of view, directly in the way shown by actual feeding of animals, and indirectly by the more complete digestion and absorption of the other food given. These experiments are scientifically of value, as showing that a meat extract is not necessarily only a stimulant, but may have nutritive value also.

BORON PRESERVATIVES.

The action of boron preservatives on *Bacillus coli* and allied microbes has recently been investigated by Prof. E. Klein, F.R.S., the specific pathogenic bacteria, which in articles of food such as milk, cream, butter, sausages, etc., may set up digestive troubles (acute gastro-enteritis, etc.), being chosen for experimentation—the well-known coli Gaertner group, viz., the *Bacillus coli communis* and the *Bacillus Gaertner*. Sterile faintly alkaline "nutrient broth" (beef broth, peptone, salt) was prepared, and mixed as required with Douglas's boron preservative (100 per cent boracic acid) to the amount of 0·5 per cent. Control experiments were carried out with non-boracicized broth (sterile). The tests were extended over a period of ten days. The results may be tabulated as follows at 70° to 71° F. incubation :—

SERIES I.—(*a*). *Bacillus coli* in 0·5 per cent boron broth 800,000 per cc., reduced in 48 hours to less than 600,000 per cc.,, and further reduced in 10 days to 200 per cc.

(*b*). *Bacillus Gaertner* in 0·5 per cent boron broth 1,500,000 per cc., reduced in 48 hours to less than 1,000,000 per cc., and further reduced in 8 days to 400,000 per cc., but increased after 10 days to over 2,000,000 per cc.

SERIES II.—(*a*). *Bacillus coli* in 0·5 per cent boron broth 6400 per cc., reduced in 48 hours to less than 500 per cc., and further reduced in 10 days to *nil* per 1·5 cc.

(*b*). *Bacillus Gaertner* in 0·5 per cent boron broth 1200 per cc., reduced in 48 hours to less than 500 per cc., and further reduced in 5 days to 140 per cc., but increased again after 10 days to 500 per cc. The control experiments showed enormous increases in the numbers of bacilli present, viz., 800,000 *Bacilli coli* per cc., becoming 440,000,000 per cc. in 48 hours, and 1,500,000 *Bacilli Gaertner* per cc. becoming 130,000,000 per cc. in the same time.

The definite conclusion to be drawn from the experiments is that 0·5 per cent boracic possesses in beef broth a decided inhibitory, restraining, and disinfecting action on the life and growth of both *Bacillus coli* and *Bacillus Gaertner*.

Other experiments were conducted by Prof. Klein with (*a*) sausage meat and (*b*) veal-pork broth, both media being first carefully sterilized. The results were practically the same—an inhibitory, restraining, and disinfecting action on the life and growth of both *Bacillus coli* and *Bacillus Gaertner*, though in the case of the veal-pork broth and the *Bacillus Gaertner* there was a very slight increase corresponding with the decrease in the case of the same bacillus when inoculated into boron broth (beef)—the increase in the veal-broth experiments being explained by Prof. Klein as due to a precipitation of some of the boracic acid and a consequent weakening and reduction of the 0·5 per cent medium. The use of the *Bacillus typhosus* gave similar but more marked results—the boron preservative (0·5 per cent) having a very marked restraining and disinfecting action on the germ.

The above results are important, as showing the action of boron preservatives upon specific pathogenic germs. It is already agreed

by all observers that the boron preservatives prevent and inhibit fermentative (formation of lactic acid, curdling of milk, and souring of cream) and putrefactive (decomposition of proteid with the evolution of malodorous gases) changes.

Dr. Klein's experiments are somewhat in contradistinction to those of Dr. Julius Bernstein, carried out on behalf of the City of Westminster, and dealing specially with the effects produced upon the processes of putrefaction by boric acid. The results of Dr. Bernstein's experiments may be given for comparison, as follow :—

1. Twenty gr. of boric acid to the pound have a peculiar and unequal effect upon the varying processes of putrefaction—the saprophytic organisms (including those producing the odours of putrefaction) being inhibited, but the coliform group of organisms (including Gaertner's bacillus) being affected in a much less degree.

2. Where putrefaction has already commenced, boric acid (in the same strength, viz., 20 gr. to the pound) inhibits further changes, possibly leading to diminution of any smell that may exist.

3. The boric acid has a marked selective activity on the various organisms, inhibiting the growth of yeasts and organisms of the *proteus* group, and possibly other harmless saprophytes, though not the organisms of the *coli* group. In this way, stale meat can be used for the making of sausages, and even meat that has already started decomposition, provided it is mixed with boric acid as a preservative ; and if to such meat Gaertner's bacillus has obtained access, it will have had several days at least in which to grow, and, what is important, unhindered by the prolific saprophytes.

FORMALIN VAPOUR FOR DISINFECTING BOOKS.

The difficulties connected with the disinfection of books infected with scarlet fever, diphtheria, typhoid, etc., are well known to all engaged in Public Health administration. Steam is efficacious, but such an agent destroys the binding of the books. Formalin vapour is, consequently, used by many. The following experiments recently carried out by Dr. Renney, M.O.H., Sunderland, are important as showing that disinfection of books by formalin vapour is practically useless. The experiments were bacteriological—the books being infected with micro-organisms derived from scarlatinal throats, diphtheria, and enteric fever (typhoid), together with pus taken from a suppurating parotitis in a case of enteric fever.

The formaldehyde was generated by an alformant lamp, using 60 Schering's formalin tablets in a chamber of about 350 cubic feet capacity, and the books were placed in an upright position on wooden rails 2 inches broad and 3 inches apart, the pages being opened as far as possible. The floor of the chamber was sprayed with formaldehyde. The conclusions arrived at by Dr. Renney are as follows :—

1. That the disinfection of books by exposure to formalin vapour for forty-eight hours is impossible, for it was found that the test organisms were killed by such exposure only when the infected pages were purposely placed open so that the vapour had easy access thereto, whilst, where the infected pages were loosely closed by strips of gummed paper, the test organisms on those pages were not killed.

2. That it is necessary for the effectual sterilization of books that they should be exposed to a temperature of 180° to 190° C. in a hot

sterilizer for an hour or two on three successive days, in order to ensure the destruction of micro-organisms which, though apparently not pathogenic, appear to be present in most books.

3. That the presence of these organisms appeared, in some of the experiments, to inhibit the growth of the various test organisms, and, in others, to prevent growth altogether.

4. That sterilized books which have been infected with the above test organisms can be disinfected by exposure to dry heat at a temperature of 150° to 165° C., or even less (110° to 120° C.), in a hot sterilizer for an hour, preferably on two or three successive days, the organisms being killed by this temperature.

5. That a temperature of even 180° to 190° C. for an hour does not injure the paper or the binding, whether the latter is of leather or cloth; that the boards are warped at the end of the time, but that the application of a heavy weight, until the books are cold, restores them to their normal conditions.

HOUSING AND TOWN PLANNING.

An important and far-reaching Act of Parliament, known as the Housing, Town Planning, etc., Act, 1909, was passed on Dec. 3rd, 1909, and came into immediate operation, except Sub-section 7 of Section 17 (relating to underground rooms), which came into operation on July 1st, 1910. The Act consists of 4 Parts and 6 Schedules, and amends the Housing of the Working Classes Acts, 1890 to 1903, introducing also new provisions as to town planning, appointments and duties of county medical officers of health, and the establishment of public health and housing committees of county councils. The Act does not extend to Ireland.

Part I. deals with the housing of the working classes, and is to be read in conjunction with the Housing Acts 1890 to 1903, with which it may be cited together as the Housing of the Working Classes Acts, 1890 to 1909. The new and amended powers are as follows:—

1. Part III of the 1890 Housing Act becomes compulsory (instead of being adoptive as formerly), enabling Local Authorities to provide houses for the working classes, and, for this purpose, to acquire land, not by Provisional Order, to be confirmed by Parliament, but simply compulsorily by an Order, to be submitted to, and approved by, the Local Government Board, with loans up to 80 (instead of 50) years.

2. Part II of the 1890 Housing Act is amended so that, whilst a Local Authority still has power, and the duty, to inspect their district for houses unfit for human habitation, such records thereof must be kept as the Local Government Board prescribe, and further, so that closing orders for houses unfit for human habitation are no longer to be made by a Court of Summary Jurisdiction, but by the Local Authority themselves, the owner or owners aggrieved having the right of appeal to the Board within 14 days after service of the Order. [N.B.—It is suggested that, before a closing order is made, the owner or owners and all persons interested should first have an opportunity of being heard.] In the case of compulsory removal, the allowance to a tenant is to be determined by the Local Authority with the consent of the owner, or, failing such consent, by a Court of Summary Jurisdiction; but no allowance to a tenant is to be made, if the house has been rendered unfit by the tenant or some one for whom such tenant is responsible.

3. In future contracts for letting a house at a rent (in a borough of 50,000 population or upwards not exceeding £26, in London not exceeding £40,

and elsewhere not exceeding £16), there is to be implied (*a*) a condition that the house is, at the commencement of the holding, fit for human habitation (except when let for not less than three years, and the lessee is to put it into a fit condition), and (*b*) an undertaking that the house shall be kept so fit by the landlord. If the undertaking is not complied with, the Local Authority is to require the landlord by a 21 days' notice to execute the necessary works, and if the requisition is not complied with, and if the landlord does not give notice of his intention to close the house, the Local Authority may do the work, and recover the expenses from the landlord. In this matter the landlord has a right of appeal to the Local Government Board.

4. Underground rooms habitually used as sleeping places, the surfaces of the floors of which are more than three feet below the surfaces of the parts of the streets adjoining or nearest to the rooms, are, after July 1st, 1910, to be regarded as unfit houses, if they are not on the average at least seven feet in height from floors to ceilings, or unless they conform to such regulations as the Local Authority, with the consent of the Local Government Board, may prescribe.

5. Where a closing order has been operative for three months, and the house has not been (and is not being) rendered fit for human habitation, or where any building (being or being part of the house) is a nuisance or injurious to health, the Local Authority are to make a demolition order—provision being made for hearing the owner and giving him an opportunity to render it fit.

6. The power of making By-laws under the Public Health Act, 1875, Section 90, with respect to houses let in lodgings or occupied by members of more than one family, is extended to the case of houses intended for the working classes.

7. Lodging-houses for the working classes, charging not more than sixpence per night, are to be discharged from Inhabited House Duties upon the production of the Medical Officer's certificate that any house is solely constructed and used for lodgers, and that due provision is made for their sanitary requirements.

8. The 1890 Housing Act is also amended with respect to improvement and reconstruction schemes.

9. Increased powers of entry into houses and premises are given to persons authorized by a Local Authority, on giving twenty-four hours' notice to the occupier and owner.

10. The erection of back-to-back houses, intended to be used as working-class dwellings, is prohibited for the future, any such house, commenced to be erected after the passing of the Housing, etc., Act, 1909, being deemed to be unfit for human habitation for the purposes of the provisions of the Housing Acts, with the following exceptions:—

(*a*) A house containing several tenements placed back-to-back, if the Medical Officer of Health certifies effective ventilation of all the habitable rooms in every tenement, and (*b*) A house abutting on any street the plans whereof have been approved by the Local Authority before May 1st, 1909, in any borough or district in which, on Dec. 3rd, 1909 (the date of the passing of the Housing, etc., Act, 1909), any local Act or By-law is in force, permitting the erection of back-to-back houses.

11. Rules with reference to appeals have to be made by the Local Government Board, who, by another Order, have to prescribe the forms of notices, etc., to be used in connection with the powers and duties of a Local Authority under the Housing Acts.

12. Power is given to the Local Government Board to make an Order directing a defaulting Authority under Parts 1, 2, or 3 of the 1890 Housing Act to remedy the default, and the order may be enforced by mandamus, and this power extends even to the house-to-house inspections to be made by a Local Authority from time to time, with a view to ascertaining whether any dwelling house is in a state so dangerous or injurious to health as to be unfit for human habitation.

Part II. of the Housing, etc., Act, 1909, has reference to new and important provisions as to town planning, securing proper sanitary conditions, convenience in connection with the laying out and use of land and of any neighbouring lands, etc., all schemes to receive the previous consent of the Local Government Board by Order, and to be in conformity with general provisions since made by the said Board under Section 56 of the Act, and known as the Town Planning Procedure Regulations (England and Wales) 1910.

The Housing, Town Planning, etc., Act, 1909, is an example of legislation by reference. What is wanted now is an Act to consolidate and simplify the numerous existing Housing Acts.

An important question arises, in connection with closing orders and rendering (and keeping) dwelling-houses fit, as to "what is unfitness?" To assist in answering this question, the Mansion House Council (London) have held a Conference of experts, who have decided as follows:—

1. *Rendering and Keeping Houses Fit* (*Sections* 14, 15).—Such houses must be (*a*) sufficiently lighted and ventilated in individual rooms, or throughout the whole house, (*b*) free from dampness of walls or dampness rising from the site (though the mere absence of a damp course is not enough to condemn a house as unfit), (*c*) free from noxious or offensive emanations from the site, (*d*) provided with sufficient and suitable sanitary accommodation (water or earth closets, etc.), (*e*) provided with a sufficient water-supply, (*f*) in a state of general cleanliness (largely the occupier's concern) and free from vermin, (*g*) properly drained, (*h*) fitted with open fireplaces, windows (made to open top and bottom), etc., (*i*) provided with sound floors, staircases, roofs and walls, etc.

2. *Closing Orders* (*Sections* 17 *and* 18).—Before applying for closing orders, the houses must be in a condition so dangerous or injurious to health as to be unfit for human habitation, i.e., there must be one or more conditions which could be dealt with as a nuisance under the Public Health Acts, such as dirt and vermin, dampness, bad or defective drains, noxious effluvia arising from the site, and possibly inadequacy of ventilation or lighting, i.e., absence of sufficient means for letting in light and air. Defective floors, staircases, walls and ceilings, etc., which make a house unsafe, are not *necessarily* included.

LOCAL GOVERNMENT BOARD ORDERS AND MEMORANDA.

During the year 1910 several important Orders and Memoranda have been issued by the Local Government Board, dealing with Medical Officers of Health, and Public Health Departments, of which they are now acknowledged by the Board as the heads:—

1. *Antitoxin Order.*—Under the powers given by the Public Health Acts for providing, or contracting with any person to provide, a temporary supply of medicine and medical assistance for the poorer inhabitants of districts with the consent of the Local Government Board, "diphtheria antitoxin" can now be supplied under the special Order, together with such medical assistance as may be necessary or advisable in connection with the temporary supply of such. The arrangements with respect to the keeping, distribution, and use of the diphtheria antitoxin are to be made in accordance with the advice of the Medical Officers of Health, and, for that purpose, the duties of such officers, assigned under the Sanitary Officers Orders or the Regulations for the time being issued by the Local Government Board, are deemed by the Antitoxin Order to extend to, and to include, all

action by Medical Officers of Health in the execution and carrying out of such Order. Further, power is given to the Sanitary Authorities under the Antitoxin Order, or the Sanitary Authorities may be required by the Local Government Board, to pay from time to time to the Medical Officers of Health, in addition to their usual salaries and other compensations, reasonable compensation for all actions by Medical Officers of Health in the execution of the Order.

The object of the Antitoxin Order is to secure the prompt use of diphtheria antitoxin in the case of persons who may be attacked by diphtheria, or exposed to the infection of the disease, i.e., the antitoxin may be used both as a curative and as a prophylactic agency. Everything depends upon the promptness with which the antitoxin is administered—the earlier the better. The provision of antitoxin by a Sanitary Authority is not to be regarded as a substitute for the proper isolation (preferably at hospital) of cases, or the systematic bacteriological examinations of swabs taken from the patients' noses and throats, etc. Where a patient is under the care of a medical practitioner, the latter should, in ordinary circumstances, be the person to administer the antitoxin, and the Board think it advisable that in Poor Law cases the antitoxin should be provided by the Sanitary Authorities for the use of the Guardians' Officers.

2. *Plague Memorandum and Order.*—An important Memorandum has been issued under the signature of the Chief Medical Officer of the Local Government Board, dealing with the general characteristics of the disease (symptoms, diagnosis, method of spread, rats as "carriers," etc.), and its preventive measures (*a*) against human infection, (*b*) in regard to inanimate objects, and (*c*) against rats.

The Memorandum has been issued in view of the cases, suspected to be pneumonic plague, that have occurred during 1910 in Suffolk—the disease having been found apparently existing in rats and other rodents in the same district, at least, in so far as the *Bacillus pestis*, or a bacillus indistinguishable therefrom morphologically, has been found present in such rats and rodents. Within the past ten years, sporadic outbreaks of plague have occurred at Glasgow, Liverpool, Cardiff, and Leith, though it is nearly 250 years since the disease (as an epidemic) disappeared from Great Britain—the last epidemic outbreak of plague in Great Britain being in 1664–1679.

The various forms of plague are (*a*) bubonic, (*b*) septicæmic, (*c*) pneumonic, (*d*) gastric, and (*e*) ambulatory (or ambulant); and bacteriological examinations are of the greatest importance as a means of diagnosis.

The rôle played by the rat in plague is emphasized; indeed, the disease may be regarded, for administrative purposes, as a disease of rats, which incidentally and occasionally attacks man. Fleas form the intermediaries between the diseased rat and man, and it follows, therefore, that, if the fleas of infected rats (or the fleas of such other animals as occasionally suffer from plague) are excluded from access to human beings, plague will seldom, if ever, spread from animals to man. So important is the subject of rat infection with plague that the Memorandum tabulates in large, leaded type the following precautionary measures: (i) Persistently and systematically destroy all rats; (ii) Remove and obliterate their nests, burrows, and habitual haunts; (iii) Make each dwelling as far as practicable rat-proof, and remove

all known harbourage for rats in or near dwellings ; (iv) At the same time do not allow waste food (whether for human beings, chickens, or other animals) to accumulate in or about the house.

N.B.—Rat-plague is not necessarily accompanied or followed by human plague.

The Order deals with the destruction of rats and the prevention of their entrance into buildings and other premises, in districts where plague in rats is present, or suspected, or in which there is an unusual rat-mortality.

3. *Sanitary Officers* (*outside London*) *Order*.—The regulations relating to Medical Officers of Health and Inspectors of Nuisances appointed by Sanitary Authorities *outside* London have been revised and added to, and a new Order (1910) has been issued by the Board, and will come into operation on January 1st, 1911, except the provisions relating to tenure of office, which will come into operation on April 1st, 1911. The two previous Orders of March 23rd, 1891, are rescinded. The principal changes made by the new Order are as follows :—

1. The proviso to Article I. sets out more precisely the circumstances under which it will be necessary for the Council to submit to the Board the statement prescribed by the Article.

2. Article III. requires that, in future, Rural as well as Urban District Councils shall give notice of appointment by advertisement only. [The Board have, however, reserved to themselves the power to dispense with this requirement in special cases, and it will no longer be necessary that the advertisement should state the date on which the appointment will be made.]

3. Article VII., which takes the place of Articles 7 and 8 of the former Orders, enables the Council to make a new appointment immediately notice has been given to determine an existing appointment.

4. Articles X. and XI. prescribe new conditions as to tenure of office. Under Article X. an officer appointed for a specified term will continue to hold office from year to year, after the expiration of that term, and no further approval of the Board will be required unless the terms of the appointment are altered. If the Council wish to dispense with the services of an officer at the end of any year, they must give him three months' notice of their intention and at the same time send a copy of the notice to the Board. Under Article XI the Council, with the Board's consent, may, at any time during the period of a limited appointment, change the appointment into one without limit of time.

5. Article XIX alters in some respects the duties of a Medical Officer of Health, as defined by Article 18 of the previous Order. Thus, an extra duty is imposed by Sub-clause 13 of sending to the Board *weekly* a list of cases of infectious disease notified in his district and a duplicate of the list to the Medical Officer of Health for the County. The Board will shortly address a circular letter to the Medical Officers of Health with regard to the details of the arrangements for carrying out this duty, and will send a copy of that circular letter to the Clerks of the Councils.

Sub-clause 14 sets out, in somewhat greater detail than before, the Board's requirements as regards the Annual Reports of Medical Officers of Health.

Sub-clause 15 requires the Medical Officer of Health to report to the Board forthwith any case of plague, cholera, or small-pox brought to his knowledge. It will be observed that the last part of Sub-clause 15 of Article 18 of the previous Order has been omitted, and that it will no longer be necessary for the Medical Officer of Health to report to the Board the cases in which he advises the closure of any school in his district.

By Sub-clause 16 the Medical Officer of Health is to transmit to the Board three copies of each annual report and one copy of any special report. The Board take the opportunity, in the covering circular letter, of urging that the

Councils should cause the annual reports of the Medical Officers of Health to be printed each year, so that a sufficient number of copies may be available for distribution to the Boards, the County Councils, the Councillors of the districts, and other persons interested.

6. In Article XX. the duties of an Inspector of Nuisances, as set out in the previous Order, have been retained subject to some slight amendments in details, and some additional duties, which are frequently discharged by an Inspector of Nuisances, have been brought within the scope of the new Order.

It will be observed that the wording of the Article has been altered so as to emphasize the fact that the Inspector of Nuisances should, as a rule, act under the general supervision of the Medical Officer of Health, who must be regarded as the head of the Public Health Department of the Council.

Sub-clause 14 requires the officer, if so directed by the Council, to perform new duties in regard to the removal of cases of infectious disease to hospital, and in regard to disinfection of premises where infectious diseases have occurred.

By Sub-clause 15 he is to act as Inspector of Canal Boats, if so directed by the Council.

Many Inspectors of Nuisances are already discharging the duties referred to in these two sub-clauses at separate salaries. In these cases the Council is to pass a resolution increasing their salaries as Inspectors of Nuisances by the amounts of such separate salaries, and to send a copy of the resolution to the Board, so that they may sanction the increase. If these duties are in future assigned to an Inspector of Nuisances, his salary should be increased accordingly.

By Sub-clause 16 the Inspector of Nuisances is to make an annual report to the Council on the work performed by him during the year.

With the Order, a Memorandum has been sent round, containing general observations on appointments of Medical Officers of Health and Inspectors of Nuisances, together with a covering circular explanatory letter.

4. *Housing (Inspection of District) Regulations.*—This Order is made under Section 17 (1) of the Housing, Town Planning, etc., Act, 1909, and deals with regulations with respect to the manner in which inspections of districts are to be carried out (and the nature of the records to be kept of such inspections), with a view to ascertain whether any dwelling-houses therein are in a state so dangerous or injurious to health as to be unfit for human habitation. Lists of dwelling-houses for early inspection are to be prepared, and the records of such inspections are to be kept in the form of (*a*) books, (*b*) separate sheets, or (*c*) cards, and are to contain information as to :—

(i) The situation of the dwelling-house, and its name or number.

(ii) The name of the officer who made the inspection.

(iii) The date when the dwelling-house was inspected.

(iv) The date of the last previous inspection and a reference to the record thereof.

(v) The state of the dwelling-house in regard to each of the following matters : (*a*) Arrangements for preventing the contamination of the water supply ; (*b*) Closet accommodation ; (*c*) Drainage ; (*d*) The condition of the dwelling-house in regard to light, the free circulation of air, dampness and cleanliness ; (*e*) The paving, drainage, and sanitary condition of any yard or out-houses belonging to or occupied with the dwelling-house ; (*f*) The arrangement for the deposit of refuse and ashes ; (*g*) The existence of any unfit underground room ; (*h*) Any other defects which may tend to render the dwelling-house dangerous or injurious to the health of an inhabitant.

(vi) Action taken by officers, either independently or on the directions of the Local Authority.

(vii) The result of any action so taken.
(viii) Any further action which should be taken in respect of the dwelling-house.

It is further stated in the regulations that, where an Authority has already made arrangements whereby systematic house-to-house inspections are carried out, the regulations shall not inferfere with such arrangements, provided the inspections include the whole of the details mentioned by the Board as to the information necessary to be tabulated with respect to each house.

5. *Town Planning Procedure Regulations* (*England and Wales*).—This Order is made under Section 56 of the Housing, Town Planning, etc., Act, 1909, and deals with general provisions with respect to applications for authority to prepare, or adopt, a town planning scheme, the preparation of the scheme, the carrying out of the scheme, etc.

OPHTHALMIA NEONATORUM.

The Local Government Board have approved an Order during 1910 making ophthalmia neonatorum compulsorily notifiable throughout the Metropolis. This compulsory notification is suggested as the best first means of controlling the ravages of the disease known as ophthalmia neonatorum (contagious ophthalmia of new-born infants), which is estimated to cause 40 per cent of the blindness of children in the London public elementary schools, there being, at present, no effective administrative control over the disease. The disease affects infants generally during the first month of their lives, and is often the direct result of neglect or want of care at the time of birth. Treatment gives the best results in the very early stages of the disease.

Several provincial towns* have already adopted the compulsory notification of the disease, and a Departmental Committee upon the Midwives Act, 1902, have reported upon the advisability of the disease being made compulsorily notifiable under the Infectious Diseases Notification Acts. No new legislation is needed, as existing Acts can be extended so as to include ophthalmia neonatorum as a dangerous infectious disease.

RAT-EXTERMINATION.

The recent scare of plague in England, and the issuing of the Local Government Board's Memorandum and Order in connection therewith, have emphasized the need that exists for some safe and sure method of exterminating rats, which are a common medium by which plague is introduced or spread. The ordinary methods of shooting, hunting by dogs, cats, or ferrets, catching in traps, etc., are not wholesale enough, whilst poisoning with arsenic, phosphorus, strychnine, barium, etc., is dangerous to other animals, and may cause a nuisance or danger to health to human beings by reason of the poisoned rats dying and remaining under floor-boards, etc., and afterwards putrefying. Consequently, bacteriologists have suggested some form of disease, which is slowly fatal to rats and other rodents but harmless to other animals,

* Fenton, Longton, Newcastle-under-Lyme, Burslem, Stoke-on-Trent, and Chester.

being spread amongst the rats, which, in their turn, would continue to spread the disease by infection from one to another. There are diseases which affect only animals of certain species, e.g., hog cholera, swine fever, etc., and bacteriology has succeeded in furnishing a germ or germs that cause disease (affecting the intestines) in rats and other rodents, but apparently, as far as we can judge at present, not in other animals. These bacillary poisons or toxins vary somewhat, at least in name. Thus, the following have already been introduced, and are spoken of more or less as effecting the purpose for which they have been introduced: Ratinin, Rattin, Rattintod, Rattite, Laroche, Liverpool Virus, and Danysz Virus. All are proprietary articles and made in England, with the exception of Rattintod (at Dresden) and Rattin (at Aalberg). The bacilli are cultivated on various media, and mixed with food which rats eat. The effect of the bacillus, or its toxin, upon the rat is to produce an intestinal (infectious) disease, spread through the fæces to other rats through the medium of food, etc. The incubation takes a few days (four to seven), when the symptoms of the disease are noticed, the rats becoming drowsy and dull in their movements, with a "blown-up" appearance, sores on the skin, etc., and finally death ensues, but death only to rats and mice and similar rodents. Farm stock, poultry, dogs and cats, birds, and man do not appear to be affected. Further, the rats, before death, appear to leave their burrowings and nestings with the object of getting into the open air and near to water, thereby preventing their dead bodies from being left under floors, etc.

Reports as to the success in practice of these bacillary or microbial poisons are at present contradictory, and the results vary—probably owing to the varying potency of the toxins used and the varying susceptibility of the rats. Some rats may be immune, or may become so when fed with small quantities of a diluted culture or a culture of low toxicity. Much more scientific work requires to be carried out in a bacteriological laboratory before definite statements can be made as to the value or otherwise of toxins as a means of exterminating rats.

LEGAL DECISIONS

AFFECTING MEDICAL MEN AND THE PUBLIC HEALTH.

By JOSEPH PRIESTLEY, B.A., M.D., D.P.H.

Medical Officer of Health, Metropolitan Borough of Lambeth.

ADULTERATION OF FOOD AND DRUGS.

DRAPER *v.* NEWNHAM (King's Bench Division).

Sale of Food and Drugs Act, 1875, s. 25—*Written Warranty given with Milk, and its sufficiency.*

A farmer supplied milk for years under a verbal contract to a milk vendor, and once (previously) had given him a written warranty. A sample of the milk was certified to be " not of the nature and substance and quality demanded," and there was, consequently, an offence under Section 6 of the 1875 Sale of Food and Drugs Act. The defendant relied upon the verbal warranty as supplementing the previous written warranty, and the magistrates refused to convict. On appeal, it was *held* that the warranty was sufficient in the circumstances. *Appeal dismissed.*

HOUGHTON *v.* MUNDAY (King's Bench Division).

Sale of Food and Drugs Act, 1875, s. 6—*Unauthorized sale by servant is no defence—Absence of " mens rea " is no defence.*

A summons was taken out against a vendor of butter that was not of the nature, substance, and quality demanded, and, on being heard, was dismissed by the Magistrates on the ground that the sample of butter was sold by the vendor's servant under a mistake and contrary to express orders, and that such servant was acting outside the scope of his authority. On appeal, the Magistrates' decision was held to be wrong, and the case was remitted to the Magistrates to convict.

Held, that it was not necessary to prove *mens rea* on the part of the vendor, and that, therefore, on these facts, he ought to be convicted.

Appeal allowed and case remitted.

BY-LAWS.

TIMOTHY *v.* FENN (King's Bench Division).

Municipal Corporations Act, 1882, s. 24—*Local Government Act*, 1888, s. 75—*Proof of By-law—Sealed copy necessary, not copy of sealed By-laws.*

This was an appeal against the decision of the Magistrates in connection with the infringement of a By-law (unlawful use of obscene language) on the ground that the Magistrates only had before them a copy of the sealed By-laws and not a copy of the By-laws sealed.

Held, that a copy of the By-laws of a County Council having a copy of the corporate seal of the Council printed upon it is not sufficient

evidence of the By-laws, and that a copy of the By-laws must be produced in court actually sealed with the corporate seal of the Council. *Appeal allowed and conviction quashed.*

COLLINS *v.* GREENWOOD (King's Bench Division).

Public Health Acts and By-laws made thereunder—Stable is not a Domestic Building to which the By-laws apply as such.

The Magistrates held that a stable, which contained no living rooms and which was erected without the consent or approval of the Local Authority, was not a domestic building within the meaning of the By-laws. This decision was upheld on appeal. *Appeal dismissed.*

DENTISTS AS UNREGISTERED PRACTITIONERS.

BELLERBY *v.* HEYWORTH (House of Lords).

Dentists Act, 1878, s. 3, *and Medical Act*, 1886, s. 26—*Unregistered Practitioners.*

This was an appeal from an order of the Court of Appeal, discharging an order of Mr. Justice Parker, in which the Court of Appeal held that an unregistered person could legally announce that he did dental work, provided that he did not say he did so as a dentist, or use any description of himself implying that he was specially qualified to practice as a dentist (*vide Medical Annual*, 1910, p. 730). This decision of the Court of Appeal was confirmed by the House of Lords. *Appeal dismissed.*

FACTORIES AND WORKSHOPS.

OWNER *v.* COTTINGHAM SANITARY STEAM LAUNDRY COMPANY, LIMITED (King's Bench Division).

Factory and Workshop Act, 1901, s. 149—*Factory and Workshop Act*, 1907, s. 1—*Non-textile Factories—Definition of "Manufacturing Process."*

Held, that the words "manufacturing process" do not necessarily refer to something being produced, but to the business carried on, and that a laundry, which is carried on for the purpose of gain, and in which mechanical power is used for driving the machines used in aid of the work of washing clothes, is a non-textile factory within the definition. *Appeal allowed and case remitted.*

FORCIBLE FEEDING BY MEDICAL OFFICER.

REX *v.* MORTON BROWN; EX PARTE AINSWORTH (King's Bench Division).

Prisons Act, 1877, s. 5—*Assault on Prisoner to feed forcibly—Summons against the Home Secretary.*

A suffragette was committed for obstructing at a political meeting, and was fined 10/- and costs, or, in the alternative, fourteen days' imprisonment. She went to prison, and on her release applied to the Magistrate for summonses against the Home Secretary, the Governor of the Prison, and the Medical Officer, on account of the last-named having forcibly fed her with a tube whilst she was in prison, thereby

committing an assault upon her. The Magistrate refused the summonses on the ground that the forcible feeding had been done in the process of law, and did not amount to an unlawful assault. On a motion for a rule *nisi* for a mandamus to the Magistrate to issue the summonses, it was *held*, that the fact that the prisons are vested in the Home Secretary by Section 5 of the Prisons Act, 1877, did not render him liable to be summoned in respect of the alleged assault.

Rule discharged.

KNACKER'S YARD.

BAILEY *v.* LOWMAN (King's Bench Division).

London County Council (General Powers) Act, 1903, s. 53—*Licence necessary for Premises used for reception or keeping of Dead Horses or of Horses for Slaughter.*

This was an appeal to the High Court on a case stated by a Metropolitan Magistrate, who convicted a defendant for unlawfully using a yard for receiving the carcases of dead horses without having previously obtained a licence for such yard for use as such. The carcases were brought into the yard, called Long Yard, in a van, wherein they remained for several hours, but the carcases were not removed from the van nor otherwise dealt with. Long Yard is a cul-de-sac, 75 to 80 yards long, and was held by the Magistrate to be a public place, though not dedicated as a street.

Held, that Section 53 of the London County Council (General Powers) Act, 1903, which makes it unlawful to use, without a licence, any yard, building, or other premises within the County of London, for receiving or keeping horses for slaughter or the carcases of dead horses, does not apply to the use of a public place by a person as one of the public, but to the use of a place by a person as the proprietor or occupier or licensee. *Appeal allowed and conviction quashed.*

NUISANCE AT COMMON LAW.

CLARK *v.* LLOYDS BANK, LIMITED (Chancery Division).

Nuisance from Noise from Building Operations in the early mornings before 7 o'clock—Injunction refused.

A hotel proprietor applied for an injunction to restrain building operations commencing near his hotel before 7 o'clock in the morning in such a way as by noise to disturb the proprietor and the occupants of his hotel. The injunction was not allowed, on the ground that the work was reasonably necessary for the construction of the premises, it being *held* that, though injury to the hotel proprietor's business must result, an injunction could not be granted.

Motion dismissed.

NUISANCE FROM VENTILATING SHAFT.

BARNETT *v.* WOOLWICH BOROUGH COUNCIL (Chancery Division).

Public Authorities Protection Act, 1893, s. 1—*Nuisance from Ventilating Shaft—Injunction refused, the Nuisance having been Abated six months previously.*

Injunction applied for against a Borough Council to restrain them from causing a nuisance by the erection of a ventilating pipe in front

of the plaintiff's premises. Seven months previously the ventilating shaft had been effectually sealed up, so that the action was not commenced "within six months next after the act, neglect, or default complained of, or the ceasing thereof," in accordance with the terms of Section 1 (*a*) of the Public Authorities Protection Act, 1893. The injunction was consequently refused. *Judgment for the defendants.*

PHARMACEUTICAL CHEMIST.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* MERCER (King's Bench Division).

Pharmacy Act, 1852, s. 12—*Unregistered Person using sign of "The Pharmacy."*

The Pharmacy Act, 1852, precludes an unregistered person from assuming, or using, the title of pharmaceutical chemist, or from assuming, using, or exhibiting any name, title, or sign implying that he is registered. The defendant kept a shop for the sale of medicines, and placed above the shop the words, "R. Mercer & Co., The Pharmacy," and the County Court Judge held that he had thereby infringed the terms of the Pharmacy Act, 1852. On appeal, it was *held*, that no offence had been committed under the Pharmacy Act, 1852, in that there had been no assuming, no exhibiting, and no using a sign, to imply that the defendant was registered under the Act, or that he was a member of the Pharmaceutical Society.

Appeal allowed.

EDWARD *v.* PHARMACEUTICAL SOCIETY OF GREAT BRITAIN (King's Bench Division).

Pharmacy Act, 1868, s. 17—*Labelling of Poisons and Definition of "Seller," whose name and address is necessary on such label.*

The name and address of the seller of a poison is needed on the label by Section 17 of the Pharmacy Act, 1868, and the Magistrate convicted a seller for giving a trade name and address. On appeal, this conviction was quashed, it being *held*, that it was sufficient under Section 17 to put on the label the seller's trade name and address as the seller's name and address.

Appeal allowed and conviction quashed.

PURVEYORS OF MILK.

EMERTON *v.* HALL (Court of Appeal).

Dairies, Cowsheds, and Milkshops Order, 1885, *Article* 6 (1)—*Dairies, Cowsheds, and Milkshops Order*, 1886, *Article* 3.

A Metropolitan Borough Council summoned a purveyor of milk for not being registered in the district, although purveying milk in that district, i.e., he sold milk on one occasion from a churn carried on a handcart or barrow in a street in that district. The premises of the purveyor of milk were situated and registered in a neighbouring Metropolitan district. The summons was dismissed on the ground that the single sale of milk in the street in an outside district did not prove that the seller was a purveyor of milk in that district. On appeal, the Magistrate's decision was upheld. *Appeal dismissed.*

RATING.

REX *v.* PROBERT; *ex parte* JONES AND THOMAS (King's Bench Division).

Public Health Act, 1875, s. 211 (1)—*Reduction in Rating not to apply to Owners who are Occupiers.*

The Rhondda Urban District Council allowed owners, who were also occupiers, to compound their rates under powers given in Section 211 (1) of the 1875 Public Health Act—rating the owners instead of the occupiers at reduced rates on lowered estimates of net annual values. The Auditor refused to allow the reductions, and a rule was moved in the High Court at the instance of the owner-occupiers concerned.

Held, that Section 211 (1) of the Public Health Act, 1875, does not authorize the Authority to rate at a reduced estimate owners who are also occupiers of the premises rated. *Rule discharged.*

RIVER POLLUTION.

ATTORNEY-GENERAL *v.* BIRMINGHAM, TAME, AND REA DISTRICT DRAINAGE BOARD (Court of Appeal).

Public Health Act, 1875, s. 17—*Pollution of Natural Stream with Sewage Water—Injunction granted and afterwards discharged under altered circumstances.*

An action was brought in the High Court by the Attorney-General, at the relation of the Tamworth Corporation and the Tamworth Rural District Council, against the Birmingham, Tame, and Rea District Drainage Board for an injunction to restrain the defendants from further polluting with sewage the River Tame. The injunction was granted, and an appeal was lodged, asking for time to enable the defendants to complete some expensive sewerage works upon which they were engaged, and which were rendered necessary in view of the fact that works already carried out had not proved to *certain* experts satisfactory from the point of view of abating the nuisance. The Appeal Court appointed an independent expert, who reported favourably upon the results of the work, stating that the river Tame was not made fouler by the effluent from the sewage farm of the Defendants. The injunction was, accordingly, discharged under the altered circumstances.

Held, that there was no longer any breach of Section 17 of the Public Health Act, 1875, and that the injunction must be discharged; and further that the Attorney-General, complaining that a public body is committing an offence against a statute, is not entitled, as a matter of right, on proving his case, to an injunction.

Injunction discharged.

WALTHAM HOLY CROSS URBAN DISTRICT COUNCIL *v.* LEA CONSERVANCY BOARD (King's Bench Division).

Lea Conservancy Act, 1868, s. 92—*Lea Conservancy Act*, 1900, s. 28—*River Pollution from Sewage Works of private owner—Liability of Local Authority.*

A private owner, at his own expense, provided a drainage and sewerage (disposal) scheme for a number of houses, the effluent of the sewerage

(disposal) scheme discharging into a ditch which joined a tributary of the river Lea. The Local Authority had taken no part in the provision of the scheme or in its construction, though the pipe conveying the sewage complained of was admittedly a "sewer." A summons was taken out against the Local Authority for the nuisance connected with the river pollution from the private drainage and sewerage works, and the Magistrates convicted, but, on appeal, the conviction was quashed.

Held, that, as the discharge of the sewage into the ditch and thence into a tributary of the River Lea had not taken place with the sanction of the Local Authority, they had committed no offence.

Appeal allowed and conviction quashed.

SEWERS.

East Barnet Valley District Council *v.* Stallard (Court of Appeal).

Public Health Act, 1875, ss. 21, 22—*Discharge of Sewage arising outside District and connection by Sanitary Authority with their Sewerage System.*

The East Barnet Valley District Council connected a storm-water drain with a soil sewer without consulting the owner of the premises draining into such storm-water drain. The premises were afterwards sold, and the District Council required the new owner to agree to terms under Section 22 of the Public Health Act, 1875, for the continuance of the connection, or to provide other means for the disposal of the sewage. The premises consisted of a dwelling-house (without the district of the Council), and a lodge and dairy (both within the district of the Council), and the drainage of the dwelling-house passed into a cesspool with an overflow drain into a pond —both cesspool and pond being within the district of the Council, whilst the drainage of the dairy and lodge joined the overflow drain from the cesspool before it reached the pond. The pond becoming a nuisance, the owner connected the overflow drain by a 9-in. pipe direct with a storm-water drain in the district of the Council. The Council claimed an injunction from the new owner to restrain him from permitting the drainage of that part of his property, which was without their district, to discharge into their sewers until the terms mentioned above under Section 22 were settled.

Held, that the connection having already been made by the Council, Section 22 of the 1875 Public Health Act no longer applied.

Appeal dismissed.

UNSOUND FOOD.

Hobbs *v.* Winchester Corporation (King's Bench Division).

Public Health Act, 1875, ss. 116, 117, 308—*Unsuccessful Prosecution in Unsound Meat Case—Compensation by the Sanitary Authority.*

Certain meat supplied to the barracks at Winchester was seized and condemned to be destroyed on the ground that it was unsound. A summons was taken out against the vendor, but was dismissed, and an arbitration was consequently held pursuant to Section 308 of the 1875 Public Health Act, arbitrators and an umpire being appointed. The umpire's award was £918 11s. 9d.—£800 for general damages and £118 11s. 9d. as costs of defence, together with a further

sum for loss of War Office Contracts—this further sum being, however, withdrawn when the Winchester Corporation refused to pay the award and the plaintiff appealed to the High Court. Judgment was given for the plaintiff for the amount claimed.

Held, that where meat has been condemned and destroyed under Section 116 of the Public Health Act, 1875, and the vendor is unsuccessfully prosecuted under Section 117 of the same Act, an arbitrator appointed under Section 308, who finds that the vendor was not in default, has power to award as damages (*a*) costs of vendor in defending himself in the prosecution, and (*b*) a sum on account of general damages sustained by vendor owing to loss of trade and business, and injury to trade and reputation. Further *held*, that it is impossible to so read Section 117 of the Public Health Act, 1875, as to extract from it an absolute prohibition against offering articles of food for sale, unless the person offering them for sale has definitely ascertained that they are in fact sound. *Judgment for plaintiff.*

Against this decision of the High Court (Mr. Justice Channell) an appeal was lodged, with the result that the Judge's decision was reversed, it being *held*, that the butcher sold the unsound meat at his peril, and that this was a matter as to which he was himself in default under Section 308 of the Public Health Act, 1875, and, consequently, that he was not entitled to compensation. *Appeal allowed.*

VETERINARY SURGEONS.

ATTORNEY-GENERAL *v.* CHURCHILL'S VETERINARY SANATORIUM LIMITED, AND JAMES CHURCHILL (Chancery Division).

Veterinary Surgeons Act, 1881, s. 17—*Veterinary Sanatorium with Unqualified Person as Director is a misrepresentation.*

A limited company was registered as a "Veterinary Sanatorium Limited," and was under the direction of a non-registered veterinary surgeon, who described himself as "M.D., U.S.A., Specialist, Managing Director." An injunction was applied for by the Royal College of Veterinary Surgeons through the Attorney-General, and was granted, it being *held*, that, although the Limited Company was not a "person" within the meaning of Section 17 of the Veterinary Surgeons Act, 1881, the title used, viz., "M.D., U.S.A., Specialist, Managing Director of the Veterinary Sanatorium Limited," inferred that the Director was a practitioner of veterinary surgery, contrary to the provisions of the Act, and that, consequently, an injunction must be granted, restraining both the company and the managing director from using any description of such director indicating that he was a veterinary surgeon or a practitioner of veterinary surgery or any branch thereof. *Injunction granted.*

WATER SUPPLY.

METROPOLITAN WATER BOARD *v.* LONDON, BRIGHTON AND SOUTH COAST RAILWAY CO. (King's Bench Division).

Metropolitan Water Board (Charges) Act, 1907, ss. 3, 8, 9, 13, 16, and 25—*Water-closets and Urinals at Stations supplied with Water do not constitute a Domestic Supply.*

A railway company was charged for a domestic supply of water on the 5% rateable value basis by the Water Board, but the County

Court Judge held that the water supply to the water-closets and urinals, etc., at the railway station, was really incidental to the purposes for which the railway is supplied, i.e., in the words of Section 25, was "for railway purposes." On appeal, the County Court Judge's decision was confirmed, and it was *held*, that water supplied by the Water Board to water-closets for the use of the travelling public at a railway station is not water supplied for "domestic purposes' within the meaning of Sections 8 and 25 of the Metropolitan Water Board (Charges) Act, 1907. *Appeal dismissed.*

N.B.—A further appeal from the Divisional Court to the Court of Appeal was made by the Water Board, but the appeal was dismissed by Messrs. Justices Cozens-Hardy (Master of the Rolls), Farwell, and Kennedy.

THE EDITOR'S TABLE.

In this section we endeavour to bring before our readers the work that is being done by inventors, and the manufacturers on their behalf. May we emphasize our desire that samples, together with descriptions and *small illustrations* (if necessary), should reach us by NOVEMBER. We experience some difficulty in obtaining compliance with this necessary condition, and trust that our friends will recognize its importance.

In respect to Pharmaceutical products and Dietetic articles, we are always ready when a sufficient quantity is sent to us *early in the year*, to arrange for it to be tested in Hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires. We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the *Medical Annual* has come to be valued.

MEDICAL AND SURGICAL APPLIANCES.

Abdominal Protector.—This instrument (*Fig.* 87) is intended for use just before the suture in abdominal operations. It is introduced while folded, and opened inside, so that the intestine or other parts are protected against the needle of the operator. It is easily removed by folding it when only a few points of suture are left to be made. The protector is all metal, and is made in two sizes by Mr. Mathieu, 4, Hercules Place, Holloway, London, N.

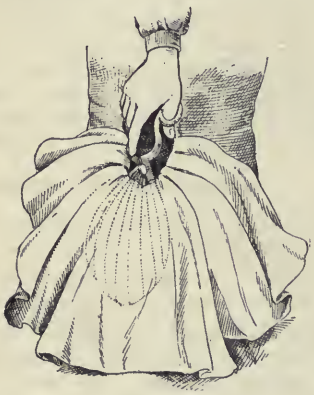


Fig. 87.

Auris.—Under this name the Medical Supply Association, 228–230, Gray's Inn Road, London, W.C., send out a device for increasing the hearing of deaf persons. It is constructed upon the telephone principle, and has advantages over other appliances of its kind in being smaller, lighter, and cheaper. We have carefully tested the apparatus, and find it very efficient. It costs £4 4s., a lower price than most similar appliances.

Bags and Cases.—*The "Harris" Bag.* — Many surgical and gynæcological bags which have come under our notice have been far from satisfactory. We have examined one made by Messrs. Philip Harris & Co., of Birmingham, which we think will at once appeal to the practitioner by its practicability and nice external appearance. The bag is separated lengthways into two divisions (*Fig.* 88), of which the sterilizer occupies one. This is large enough to take the midwifery forceps, and yet occupies no space, because it forms the best possible container for the aseptic dressings and

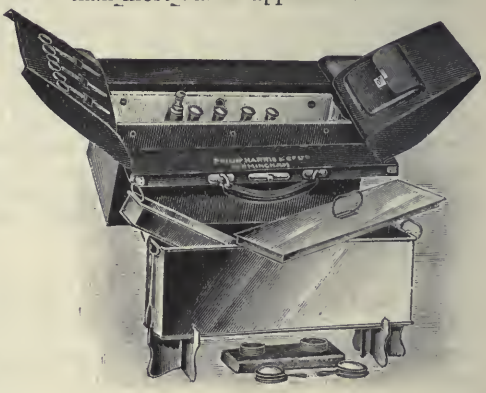


Fig. 88.

instruments which the surgeon requires to carry. It is made of copper, and has a perforated tray, lid, and a wickless two-rose lamp. The other division is furnished with a washable take-out lining, removable clips for bottles, etc. The whole is covered with brown cowhide and has excellent fittings. It measures 16 by 8 by 5½ inches, and costs 63/-. We think it would be difficult to obtain anything better for all general purposes.

An excellent bag for gynæcologists is produced by the same firm for 32/6, or the "Harris" bag without the sterilizer can be had for 27/6.

Medical and Surgical Case (combined).—Messrs. Parke, Davis & Co., Beak Street, W., have produced a new hand or carriage medicine case (*Fig.* 89).

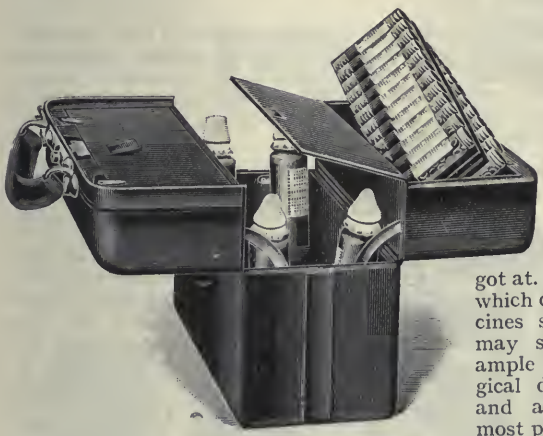


Fig. 89.

The case measures 12 by 5¼ by 10¼ ins., and is strongly yet lightly made, is covered in best quality black cowhide, and is specially convenient for carrying in the hand. When the case is opened, three compartments are disclosed, the contents of which are most easily got at. It contains 28 bottles, which can be filled with medicines such as the purchaser may select, and it affords ample room for carrying surgical dressings, instruments, and accessories. This is a most practical appliance, and will be appreciated.

Medicine Cases (Portable).—Messrs. Burroughs Wellcome & Co. supply portable medicine and emergency cases which are both dust- and sand-proof. They are convenient when the medicine case has to be carried long distances under climatic conditions which render such an arrangement desirable.

Minor Operating Case.—In order to meet the requirements of Army medical officers, another tray has been added to the minor operating-case produced by Messrs. R. Sumner & Co., of Liverpool, of which we have expressed our appreciation in a former issue. This tray contains an all-metal hypodermic syringe, clinical thermometer, and case for holding hypodermic pellets. This renders the medical officer well equipped to meet all emergencies, medical or surgical.

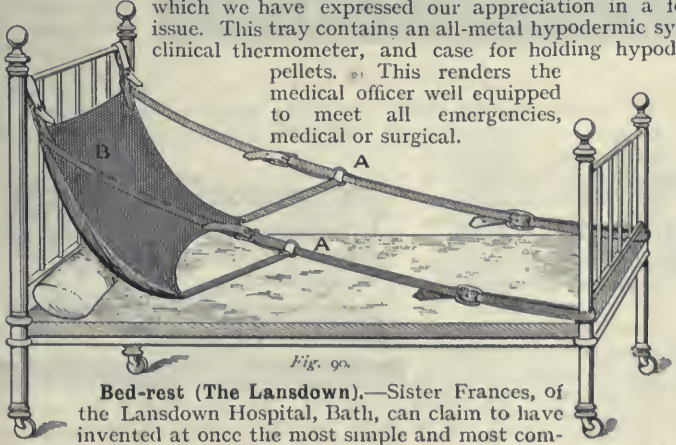


Fig. 90.

Bed-rest (The Lansdown).—Sister Frances, of the Lansdown Hospital, Bath, can claim to have invented at once the most simple and most comfortable bed-rest (*Fig.* 90). We base our opinion upon the experience of patients

who have tried all kinds. The appliance is a piece of canvas (B) nearly the width of the bed, secured at its two upper corners by webbing straps to the top rail, while its lower corners are also secured by adjustable webbing straps (A) to the lower rail of the bed. There are also a couple of webbing straps joining the lower corners of the canvas to the lower straps. By drawing these straps the patient can be maintained in the sitting position while the nurse arranges the pillows, etc., an important point in many cases where the nurse has no assistance. The appliance is a practical solution of a constant difficulty, and we recommend its use in every hospital, as well as for private patients. It is supplied by The Purpose Manufacturing Co., Teddington, and costs 7/6 complete.

Bismuth Gauze.—This is now supplied by Messrs. Ferris & Co., of Bristol, in a selvedged form, in spools 6 yds. long and of various widths. It is made to fit their "Ever-ready Caddy."

Messrs. Burroughs Wellcome & Co. also put up this gauze in widths of 1, 2 and 3 inches, in one-yard rolls; which are protected by a varnished germ-proof cover.

Blood-pressure, Instruments for.—*Pocket Sphygmometer.*—Among the many instruments for testing blood-pressure made by Mr. Jas. J. Hicks, of Hatton Garden, E.C., we think the one we illustrate here will be much appreciated by the practitioner, because it can be carried in the pocket, and used with the minimum expenditure of time. A tube which takes up no more room than an ordinary thermometer, a small rubber ball, and a small bottle containing the solution, constitute the whole apparatus. In use the rubber ball is held over the radial artery, while the gauge is held between the fingers of the same hand (*Fig.* 91). We have tested this practically, and find it quite reliable, and more convenient for the bedside or to carry from house to house, than some of the larger apparatus. Price 10/–.

Fig. 91.

Manometer.—The clinical mercurial compressed-air manometer (*Fig.* 92), manufactured by Messrs. Hawksley & Son, of 357, Oxford Street, W., at the suggestion of Dr. G. Oliver, has been tested very carefully by us, and we find it extremely accurate, as well as portable. It has the great advantage that the blood-pressure

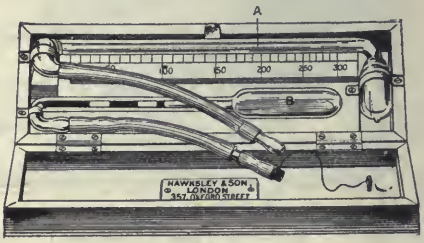


Fig. 92.

obtained by the tactile and visual method can be checked by the auditory method, so that an opinion of the actual state of the arterial pressure can be given with confidence, the personal equation being minimized. The instrument is easy to carry on the visiting round, and quickly adjusted, so that it is a very practical addition to our means of diagnosis.

Sphygmomanometer.—This apparatus (*Fig.* 93), designed by Dr. Herbert French, has for its chief advantage the fact that the mercury cannot be upset whatever position the apparatus is in. This renders it more portable and convenient than some appliances of its kind. Messrs. Down Bros.

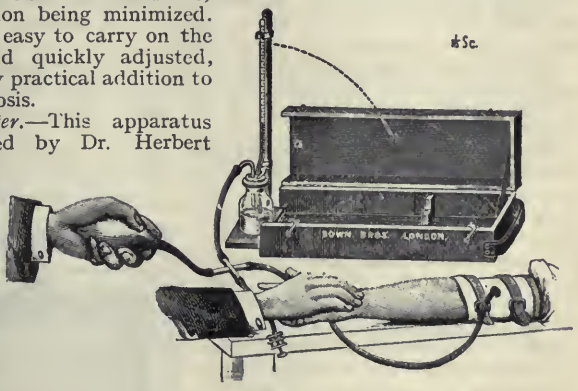


Fig. 93.

Self-controlling Sphygmometroscope.—Based on the new principle of the double armlet, this sphygmometroscope (*Fig.* 94) permits of absolutely correct measurements of blood-pressure, and, by isolating the top chamber of the armlet, gives the proof of the accuracy of its indication. A finger ring allows the pressure of the blood in the arterioles to be taken also.

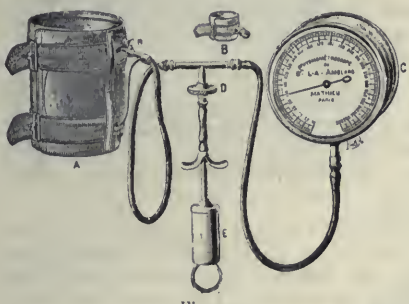


Fig. 94.

The pump, of a new pattern, is worked by one hand only, and a micrometric valve permits of the adjustment of the pressure by millimetres or a fraction of millimetre of mercury. A large metallic manometer with a very sensitive needle completes the instrument. Made by Mr. Mathieu, 4, Hercules Place, Holloway, N.

Bottles (Drop), in Oak Stand.—This little stand (*Fig.* 95) has four small bottles, each of a different colour, furnished with the new glass droppers, which allow one or more drops to be accurately dispensed. The india-rubber teats, which perish, belong to the past. These bottles will last a life-time, and are precisely the things we have wanted for ophthalmic and other solutions. The complete appliance costs 3/6. Messrs. R. Sumner & Co.

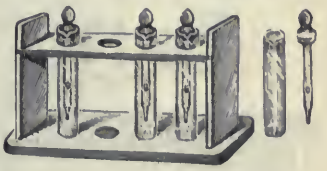


Fig. 95.

Carbon Dioxide Snow (Apparatus for).—The value of carbon dioxide snow for the destruction of vascular nævi, moles, etc., has led Mr. Hall Edwards to design an ingenious apparatus by which the snow can be made into a crayon ready for use. The arrangement is very simple, and includes an applicator by which accurate pressure of the crayon is maintained during

use. The whole appliance, together with the cylinders containing CO_2, are supplied by Messrs. Philip Harris & Co., of Birmingham, at small cost.

Messrs. Allen & Hanburys, 48, Wigmore Street, W., also supply an apparatus for producing carbonic-acid gas in pencil form, together with the cylinders, either empty or charged with liquid CO_2.

The Medical Supply Association, 228, Gray's Inn Road, W.C., supply an apparatus in which by a plunger the snow is compressed into pencils, and practically takes the form of ice, which adds greatly to convenience in use.

Messrs. Reynolds & Branson, of Leeds, have also taken up the manufacture of carbon dioxide snow crayons, and have brought their accustomed ingenuity to bear upon the process. They have arranged for crayons from $\frac{1}{8}$ inch to $1\frac{3}{4}$ inch, either round or square, and these when compressed by a mallet will last longer than those prepared by other methods. They have also introduced a collector suggested by Dr. H. E. Bateman, of York, which consists of a perforated zinc cylinder with brass mounts and wooden plunger. This leaves the hands of the operator free.

Stand and Union for Gas Cylinders.—Messrs. Geo. Barth & Co., of 54, Poland Street, W., have devised a new stand and union which much simplifies the exchange of the horizontal valved cylinders which they supply. Those interested can obtain particulars upon application.

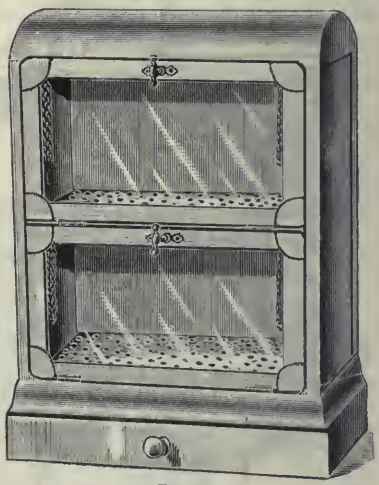


Fig. 96.

Cabinet (Antiseptic).—This is made of white enamelled iron, 20 inches high, 15 inches wide, and 8 inches deep (*Fig.* 96). It consists of two compartments with perforated metal shelves, the object of the perforations being that if tablets of formaldehyde are kept in the drawer beneath, the whole cabinet becomes filled with vapour, and if the instruments are sterile when put in, they will keep so. There are two fall-front glass doors which serve as shelves to place small instruments on during use. The top of the cabinet is rounded, thus avoiding dust catching the edges. It makes a very useful cabinet for a medical man who is called upon frequently to attend to minor injuries, and is supplied by Messrs. R. Sumner & Co., Liverpool, at £3 3s.

Fig. 97.

Cautery ("Aphyso").—This patented cautery which works with ether, is self-contained and automatic, and contains no bellows. When heated once for one or two minutes, as shown in *Fig.* 97, it can work for about three-quarters of an hour. The heat can be regulated at will by the button at the back. Different platinum points can be fitted when required, and by replacing the platinum point at a special end the cautery can be used as a chalumeau, to burn with the flame. Supplied in nickel-plated box and leather case by Mr. Mathieu, 4, Hercules Place, Holloway, N.

Curette (Flushing).—Messrs. Ferris & Co., of Bristol, send us a set of three flushing curettes fitting into one handle. They are excellently made, and are of the most convenient size and shape. They are packed in an aseptic case, and cost 12/6.

Cycles for Cripples.—There are many lame and paralyzed people amongst the poorer classes who could use some self-propelled vehicle if the price were not prohibitive. We are glad that Mr. J. H. Haywood, of Castle Gate, Nottingham, has directed his attention to this point, and can now produce suitable vehicles at quite a moderate price, that is, for children from £2 and adults from £8. When writing for particulars, it is best to say whether the lower or upper limbs are available for use.

Dilators.—*Uterine Dilator.*—In cases where the uterus is enlarged, as in incomplete abortion, there is no instrument so simple and reliable as the "Artificial Amnion" (*Fig.* 98) designed by Prof. John W. Taylor, of

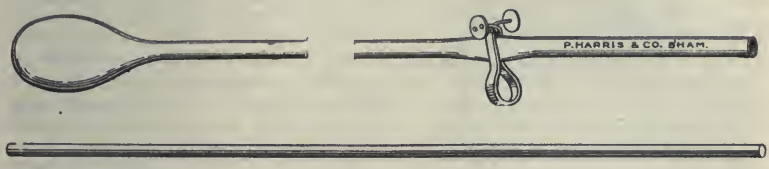


Fig. 98.

Birmingham. It is simply a thin rubber bag with a non-collapsible rubber tube, with a German silver stilette or sound, movable within the tube; an ordinary spring clip, and a suitable syringe. The collapsed bag is introduced into the uterine cavity, and then about 2 oz. of water are injected to distend it and form an artificial amnion. This will not only check hæmorrhage, but produce mild labour pains with dilatation of the uterus until the bag is born. This appliance is supplied by Messrs. Philip Harris & Co., of Birmingham, without the syringe, for 4/6, and every practitioner should have one for use in emergency.

Uterine Dilator (*Flushing*).—An excellent dilator for intra-uterine flushing has been sent us by Messrs. Ferris & Co. It permits of very gentle dilatation of the cervix, which is assisted by the stream of hot water which can be allowed to play upon the blades during the manipulation. Price 17/6.

Nasal Dilator.—To those who are looking for a really good nasal speculum, which is not easily obtainable, we can recommend one which Messrs. Ferris & Co. of Bristol, have sent to us. It has a special slot arrangement at the joint which gives a parallel movement to the blade. This enables a much clearer vision to be obtained than is usual. They are nickel-plated, easily rendered aseptic, and cost 5/6.

Fig. 99.

Douches. — *Nasal Douche* ("*The Wigmore*").—This form of "douche" will easily be understood from the illustration (*Fig.* 99). It is practically a vessel from which the fluid is snuffed up by the patient. It was suggested by Mr. Percy Allen, and is made by Messrs. Allen & Hanburys, of 48, Wigmore Street, W.

Douche (" *The Nasalique* ").—We illustrate here a simple glass douche (*Fig.* 100) for nasal use, which has been made by Messrs. C. J. Hewlett & Son, 35–42, Charlotte Street, E.C. It has the advantage of being fitted with a box-top cork, which either closes the vessel, or, when turned round, allows the contents to escape. By this method it is unnecessary to touch the fluid with the finger. We have also found this appliance useful for washing out the eye with boric acid.

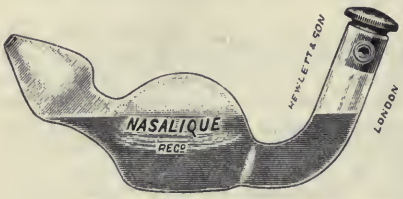


Fig. 100.

Dressings, Surgical.—*Adrenalin Gauze Tape* consists of sterilized gauze in tape lengths impregnated with 1–2000 adrenalin chloride solution and packed in sterile air-tight glass jars furnished with aluminium screw caps, through which any desired length of the tape can be withdrawn, whilst the bulk remains unexposed. Adrenalin gauze tape is very useful as a hæmostatic dressing, swab, or tampon ; the edges are selvedged, so that frilling and the consequent annoyance of loose strands are avoided. The tape is supplied in two dimensions, either 10 yards of ½-inch width or 5 yards of 1½ inches width. Messrs. Parke, Davis & Co., Beak Street, W., are the manufacturers.

Waterproof Dressings (" *Christia* ").—This is a very supple material which takes the place of oiled silk, gutta-percha tissue, and many other protectives, not only because it is cheaper, but because it is more durable when in use, and does not perish or become sticky when stored. It resists oil, grease, spirit, and chloroform, as well as water, and can be cleansed perfectly and used for an indefinite time. The manufacturers, Messrs. Thos. Christy & Co., Old Swan Lane, E.C., have lately brought out a thicker form of " Christia " for use in cases of accouchement, and we might add that it is equally useful for operations, for giving enemas and douches on the bed, and to put under the sheet in cases of enuresis. We do not regard it merely as a cheap substitute for rubber sheeting, in spite of its low cost ; it is greatly to be preferred because it will not stain, can be easily cleansed, and is of surprising durability. It should be adopted in every hospital ward. The material is itself antiseptic.

Sterilized Dressings.—Messrs. R. Sumner & Co., of Liverpool, have set up a steam autoclave for sterilizing dressings, under conditions which render it possible to deliver them in air-tight boxes direct from the autoclave. Thus, before an operation the surgeon notifies the dressings he will require, and they are delivered freshly sterilized in an air-tight box, which is not opened until the moment it is required. This costs little more than the ordinary price of dressings, and the saving of time as well as the assurance of perfect safety makes the arrangement of great advantage, and it has been much appreciated by our surgical friends.

Protective (*Transparent*).—Under the name of the " Bristol Transparent Protective," Messrs. Ferris & Co. have introduced a vegetable transparent material which is quite impermeable and not affected by oils, ether, or alcohol. It is capable of being sterilized by boiling, and can be used many times over. It does not crack or become sticky when kept for some time, which is a great advantage over oiled silk or gutta-percha tissue. Its transparency is also a distinct advantage. It is sold in sheets of 28 by 18 inches at 10/6 per dozen sheets. This is a distinct improvement in protective dressings.

Electrical Appliances.—*X-ray Outfit with Rotating High-tension Rectifier.*—This outfit, which is illustrated by *Fig.* 101, has been designed with the object of dispensing altogether with induction coils and interrupters, and thereby overcoming inverse radiation. Alternating current from the supply mains is stepped up by means of a special transformer to about 150,000 volts, and then rectified by means of a rotary rectifier into unidirectional pulsating

continuous current, which is conducted direct to the *x*-ray tube. The rotary rectifier is mounted on the same spindle as, and rotated by, a synchronous alternating current motor, but where there is only a continuous current supply a rotary converter takes the place of the alternating current motor. This type of *x*-ray outfit is suitable for instantaneous radiography without the addition of any auxiliary outfit, and large outputs can be obtained without any undue strain on the apparatus, the whole of which, with the exception of the switch-table and tube stand, is contained in a sound-proof cabinet, as illustrated (*Fig.* 101). This is manufactured by Messrs. Siemens Bros. & Co., Ltd., Caxton House, Westminster, S.W.

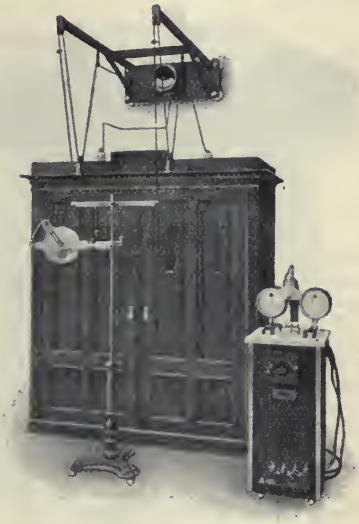


Fig. 101.

Diathermy Apparatus. — The same firm also manufactures an apparatus (*Fig.* 102) for the application of heat to any desired depth in the body. This new electrical curative treatment is known as diathermy, or thermo-penetration. The apparatus is virtually a small wireless transmitter station, but with this difference, that the high-frequency alternating current generated, serves only to heat its own path through the human body. The apparatus consists essentially of a transformer, which derives alternating current from the supply mains, but if only continuous current is available, of a small rotary converter in addition; the alternating current is stepped up by the transformer and charges the condenser of an oscillatory circuit. Oscillations from the condenser are then passed through the primary windings of a Tesla transformer, and those induced in the secondary windings are transmitted into the body. The medical applications are divided into two main groups; (1) The heating treatment, which gives rapid and beneficial results for complaints such as rheumatism, gout, neuritis, etc., and (2) The coagulation treatment, which is applied to tumours and cancers, as an auxiliary to the knife.

Fig. 102.

The Skiafix.—This is a new simple holding apparatus for *x*-ray exposures, which permits of taking radiographs in all positions of the patient, without it being necessary for the latter to leave the couch or to change his position. It consists of a baseboard, a sliding rod with clamps, and two adjustable rests. Every part of the body may be clamped in any position, and, when using a dark slide, change of position is not necessary for sagittal and side radiographs. The apparatus

also permits of accurate localization of foreign bodies in the skull by radiographing in three planes. It is illustrated by *Fig.* 103, and is supplied by Messrs Siemens Bros. & Co., Ltd.

Fig. 103.

"Float" Electrolytic Batteries.—Under this name the Medical Supply Association, 228-230, Gray's Inn Road, W.C., supply a cell for charging batteries which has a fluid charge and can be hermetically sealed. The advantage is that the cell does not deteriorate by keeping, as is the case with dry-cell batteries. This is an enormous improvement upon all electrical appliances which depend upon cells of any kind for their energy, and we shall be glad to have an opportunity of testing the claims of this cell during the year.

The Davon Electric Table.—Mr. F. Davidson, of 29, Great Portland Street, W., must be congratulated upon having put up on one table everything required for electric treatment, including the high-frequency current. Not only has he done this, but has devised an apparatus which can be used without the aid of the electric light mains, by those who have not access to them. The apparatus is not only neat and efficient, but it is produced at a price below the ordinary cost of the high-frequency current apparatus alone. The voltage attainable would not be sufficient for *x*-ray work, but for all other purposes it would be an efficient apparatus for any practitioner to use for his daily requirements, whether he wanted it for general electrolization, high frequency, cautery, or light. The cost of the apparatus as illustrated (*Fig.* 104) is £37 10s.: this includes accumulators but not a primary battery for recharging them. This would cost another £15, but many practitioners would prefer to have the accumulators recharged for them, locally.

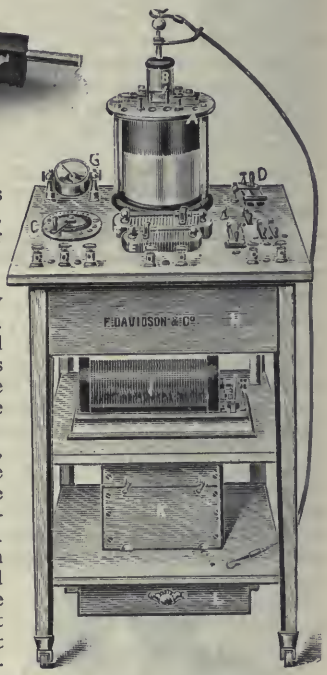


Fig. 104.

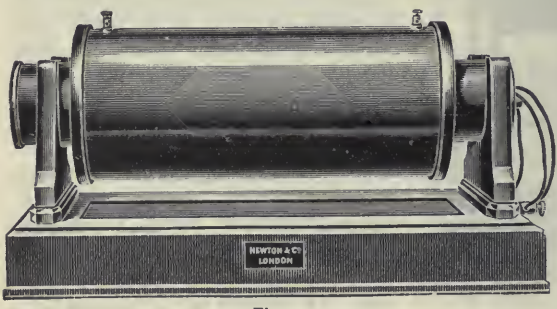


Fig. 105.

Messrs. Newton & Co.'s *"Instanta" Coil* (*Fig.* 105) for very rapid radiography is the outcome of their most recent experiments. These were carried out with a view to obtaining a coil of greatly increased efficiency and a minimum of reverse current for use with some of the modern types of mercury

interrupters. These instruments are specially suitable for working in conjunction with the new "*Dessauer*" *Interrupter*, which Messrs. Newton & Co. have recently placed on the market. The break is of the mercury type, constructed on the centrifugal principle, but is greatly simplified as regards its mechanical construction, enabling it to be very rapidly cleaned when necessary. The circuit is interrupted between a band of mercury and a rotating copper contact, which is accomplished by means of a very ingenious device for deviating the mercury out of its course at one or more points of the circle, causing the current to be made and broken at these points.

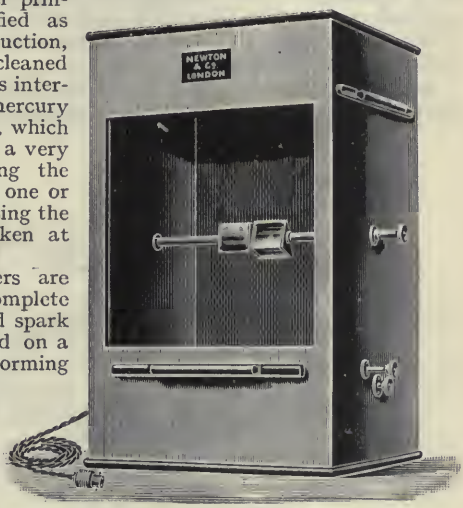


Fig. 106.

These coils and interrupters are very frequently supplied complete with suitable switchboard and spark gap, the whole being mounted on a vertical cabinet arrangement, forming a very complete installation.

Messrs. Newton & Co. are also constructing in their own London factory their latest pattern "*Universal*" *Apparatus* for general electrotherapeutic treatment, vibro-massage, etc. This is fitted with very convenient rheostats for adjusting the various currents in the simplest possible manner. The same firm have also introduced a new pattern *Stereoscope* (*Fig.* 106) for viewing *x*-ray negatives, in which silvered reflecting prisms are employed in place of the usual mirrors, enabling the stereoscopic effect to be obtained without the strain to the eyes which has hitherto been experienced in viewing radiographs by most instruments previously constructed.

Fig. 107.

Filter ("The Tandem").—This is intended to be fixed to any ordinary water-tap (*Fig.* 107). Like other filters, it becomes charged with the impurities it has removed, but it may be speedily cleansed by simply reversing it and letting the stream of water descend upon the matter which has collected in what previously was its upper part. This is one way. Another, which should be adopted regularly from time to time, is to remove the filter and boil it for a time. In this way the ordinary difficulties of a filter are practically got rid of, and at very small expense, as the filter only costs a guinea. It is supplied by the Medical Supply Association, 228–230, Gray's Inn Road, W.C.

Formaldehyde Disinfectors (Automatic).—A method of generating formaldehyde gas without heat, devised by Messrs. R. Sumner & Co. It consists of dropping a briquette of potassium permanganate into the formaldehyde solution. The result is a brisk evolution of formaldehyde gas. The advantage of this plan is obvious, especially where there is danger of fire.

Calogen Fumigators.—This is another ingenious method of utilizing the vapour of formaldehyde without the use of fire. All that is necessary is to

put one calogen into a pail or other receptacle, pour over it 5 or 6 ounces of formaldehyde solution 40 per cent, and then a brisk discharge of gas occurs which thoroughly disinfects the room. The active agent is the heat generated by a bichromate and permanganate compound. The convenience of the arrangement is self-evident, and these fumigators are being largely used by health authorities. Messrs. Chas. Zimmermann & Co., 9 & 10, St. Mary-at-Hill, E.C., are the agents.

Forceps.—*Hæmorrhoidal Forceps* (*Iles's*).—To facilitate the treatment of piles by ionization, Messrs. Allen & Hanburys, of 48, Wigmore Street, W.,

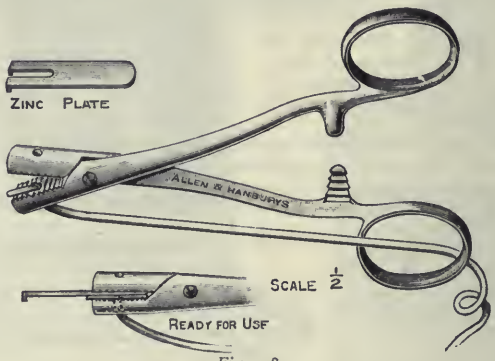


Fig. 108.

have made a special forceps, and supply zinc electrodes. The construction will be understood from the illustration (*Fig.* 108).

The same firm also make Heygate Vernon's hæmorrhoidal plug, the latest pattern of which we illustrate in *Fig.* 109.

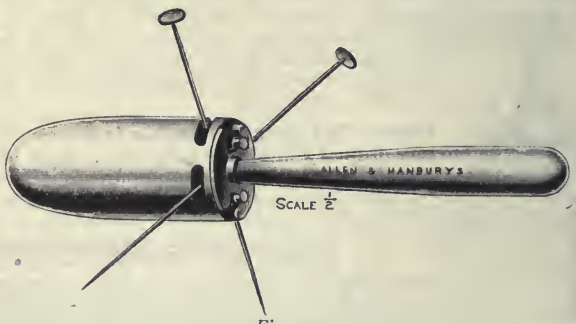


Fig. 109.

Towel Forceps.—We represent in *Fig.* 110 the Schädel design with pin points, which has not only a very firm spring, but is large enough to be

Fig. 110.

practical. Many designs are too small. They are supplied by Messrs. Philip Harris & Co., of Birmingham, and cost 2/6.

Forceps for Sterilizer.—This has been designed with a concavity in the blade, as will be seen from the illustration (*Fig.* 111), to assist the removal

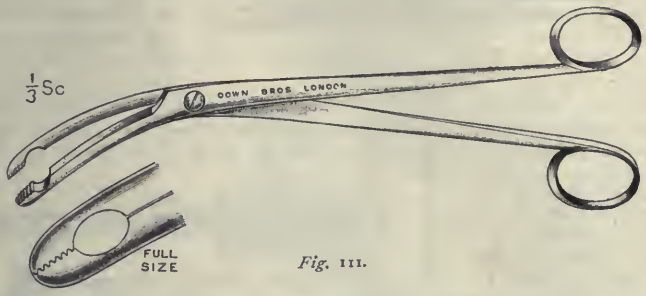


Fig. 111.

of such objects as a hypodermic syringe from the sterilizer, by Mr. B. T. Verver, and is made by Messrs. Down Bros., 21 & 23, St. Thomas Street, S.E.

Fig. 112.

Vulsellum Grip Forceps.—The forceps which we illustrate in *Fig.* 112 are an improvement upon those with scissor handles. The claw gives a secure grip. Admirably adapted for aiding the removal of embedded tonsils or any operation where a steady grip is required. Messrs. R. Sumner and Co.

"Ideal" Tongue Forceps.—This instrument (*Fig.* 113) is anatomically shaped to the tongue, the lower blade being bifurcated, allowing space for the frænum, so that the tongue rests well forward. The upper blade is longer, and slightly overlaps the lower blade, and is curved to the shape of the dorsum of the tongue. It gives an excellent and powerful grip without injury; the handles being curved downwards, the view of the operator is not obstructed by his hands. Supplied by Messrs. R. Sumner & Co.

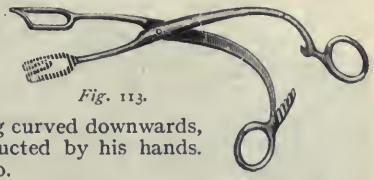


Fig. 113.

Dressing Forceps.—We have received from Messrs. Reynolds & Branson, of Leeds, an ideal form of dressing forceps (*Fig.* 114). The blades are three inches long, and they open almost parallel, so that for dilating a sinus, or grasping any considerable surface of dressing, they would be a great improvement over the ordinary forceps. They cost only 3/6 each, and we think will be of distinct advantage to the practitioner.

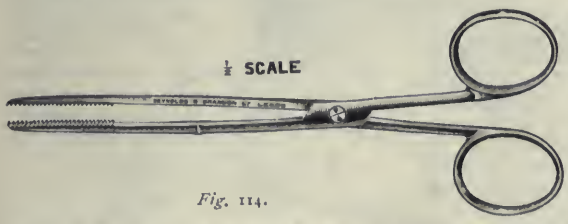


Fig. 114.

Throat Forceps.—The forceps which we illustrate by *Fig.* 115 appears to have just the right angle for efficient work. It is excellently made and easily rendered aseptic. Supplied by Messrs. R. Sumner & Co.

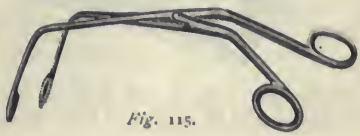


Fig. 115.

Tonsil Forceps.—Mr. H. Tilley, F.R.C.S., has designed a pair of forceps of the vulsellum type, to assist the removal of those tonsils which do not project beyond the faucial pillar. The form will be seen from *Fig.* 116. Made by Messrs. Mayer & Meltzer, of 71, Great Portland Street, W.

Fig. 116.

Nasal Forceps.—Messrs. Ferris & Co., of Bristol, send us a pair of Politzer's forceps for removing foreign bodies from the nose. The blades are detachable, and can be introduced separately behind the obstruction and afterwards locked to withdraw it. These forceps, which cost 5/6, should be available at every hospital, and most practitioners would do well to possess a pair.

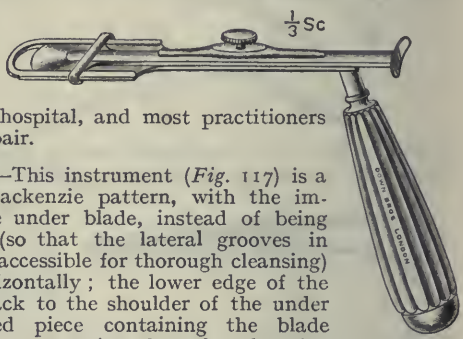


Fig. 117.

Guillotine, A New Aseptic.—This instrument (*Fig.* 117) is a guillotine of the ordinary Mackenzie pattern, with the important modification that the under blade, instead of being made as usual, in one piece (so that the lateral grooves in which the blade travels are inaccessible for thorough cleansing) is divided into two parts horizontally; the lower edge of the terminal opening is carried back to the shoulder of the under blade, so that the U-shaped piece containing the blade channels can be lifted off, thus exposing them for cleansing purposes. The upper part is secured in position by a pin joint at each extremity and a closely fitting sliding clip, which fits over the blade, and is turned under sufficiently to include enough of the back of the under blade to give a firm hold. It was suggested by Mr. A. B. R. Sworn, M.R.C.S., and is made by Messrs. Down Bros., Ltd.

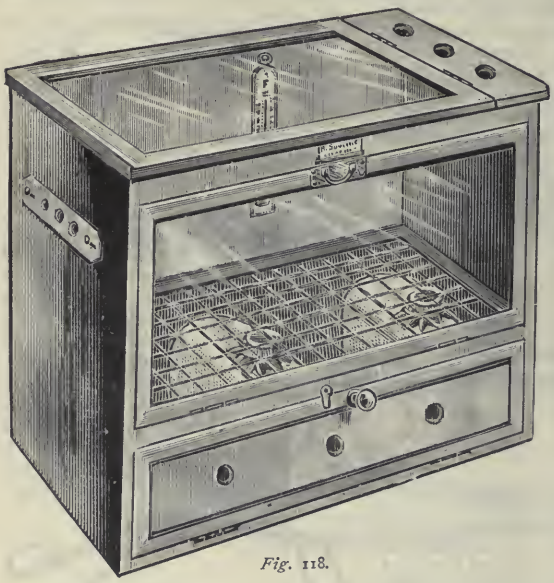


Fig. 118.

Incubator (for Babies).—This has been devised by Dr. S. J. Moore, of Huddersfield. The necessary heat is secured by hot-water bottles, and the whole apparatus, as in *Fig.* 118, is easily used by the poorer classes, to whom it is lent by the Corporation of Huddersfield. As the whole cost of the apparatus is 25/–, we hope that it may be widely adopted in other towns, as it will help to save the lives of many infants. Full particulars can be obtained from Messrs. R. Sumner & Co., Liverpool.

Inhalers.—*Open Inhalers for Anæsthetics.*—Many anæsthetists prefer a mask and a drop-bottle to the ordinary inhaler. To render the method more accurate, and to eliminate its disadvantages, Messrs. Geo. Barth & Co., of 54, Poland Street, W., have devised the apparatus which we illustrate here (*Fig.* 119). An ordinary nitrous-oxide inhaler face-piece (A) is used, and the patient breathes only through valves in such a way that the inspired air passes through gauze (D), on which any desired quantity of the anæsthetic may be dropped. The gases of expiration pass out freely through the expiratory valve (C), being prevented passing again through the gauze by the inspiratory valve which is inside the inhaler at (B); thus less than half the usual quantity of the anæsthetic is required. The apparatus costs 31/6.

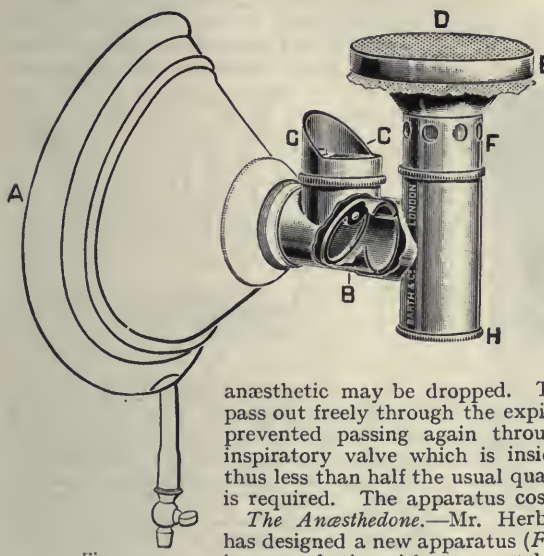


Fig. 119.

The Anæsthedone.—Mr. Herbert Tanner, F.R.C.S., has designed a new apparatus (*Fig.* 120) for administering anæsthetics, either separately or in sequence, which is a great improvement upon the well-known "Clover." One feature is that the expired air is driven against the base of the container which supplies some of the heat lost by the evaporation of the ether This serves to keep up the supply of ether vapour, which is usually diminished by the cold produced by its own evaporation. It is an excellent apparatus, and is well made by Messrs. C. J. Hewlett & Son, Ltd., 35–42, Charlotte Street, E.C.

Fig. 120.

Anæsthetic Screen.—*Fig.* 121 shows an operating-screen introduced by Mr. Edwin Maynard, F.R.C.S., while at the Bristol General Hospital; it is intended to shut off operation areas from contamination by the patient's expirations or apparatus used in maintaining anæsthesia. It can be used for operating on any site below the chin. It consists of a piece of spring steel of circular section and of ¼ inch diameter, shaped as shown. It fixes itself to an operating-table with rounded edges, and holds firmly in position by virtue of its shape and resiliency. A sterilized operating-sheet of thick honeycomb towelling, thrown over the screen and the operating table below it, is held in place on the screen by two or three pairs of Lane's tissue forceps, and the central slit in the operating-sheet exposes only the operation area. It is made by Messrs. Down Bros., St. Thomas Street, London, E.C.

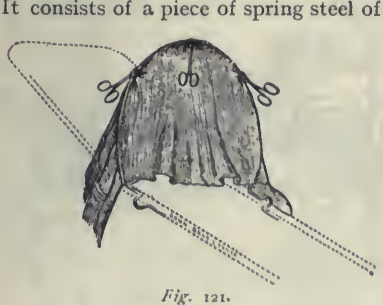


Fig. 121.

Nasal Inhaler for Nitrous Oxide.—Mr. Felix Rood, M.R.C.S., has designed a metal nose-piece with a single tube leading to the gas-bag. At the junction

of the nose-piece and the tube is placed a valve, by the rotation of which the nosepiece can be placed either in connection with the gas-bag, or air may be admitted from a side aperture, as required. It can be fitted to any gas-bag and manipulated with one hand (*Fig.* 122). Messrs. Mayer & Meltzer.

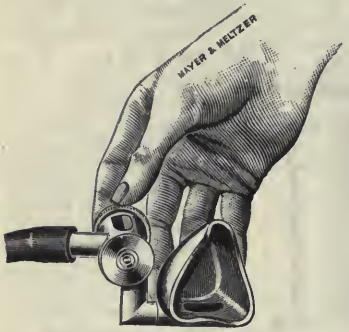


Fig 122

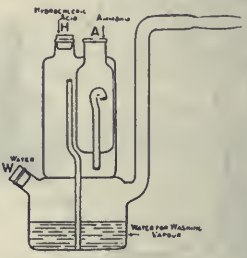


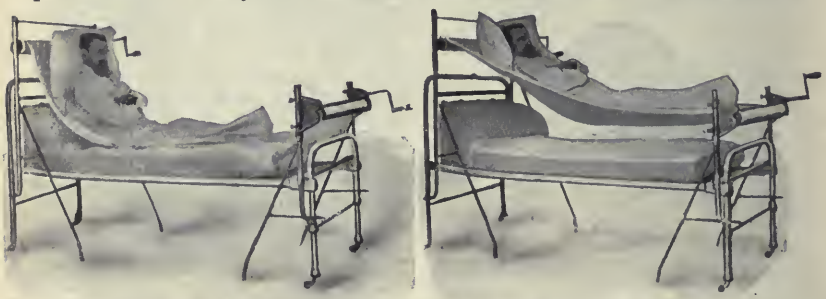
Fig 123

Chloride of Ammonium Inhaler.—The "Harris" Inhaler (*Fig.* 123) is remarkably small and compact, but it has an advantage over most of such appliances because the vapour is washed before being inhaled, by which any excess of acid or ammonia is removed. The ammonia and hydrochloric acid are supplied in glass capsules. Personally we should prefer a couple of small bottles which could be refilled as necessary, and there is nothing to prevent this plan being adopted. It is a perfect appliance, and only costs 3/6. Messrs. Philip Harris & Co., Birmingham.

Fig. 124.

Insufflator ("The Cloudique").—One of the best insufflators which have come under our notice is illustrated by *Fig.* 124. It is not only small and compact, but it projects the powder in a very fine cloud. It can be used for the skin or nose, and will be found especially serviceable in the treatment of catarrh of the ear. There appears nothing likely to get out of order or cause trouble. Messrs. C. J. Hewlett & Son, Ltd., 35–42, Charlotte Street, E.C.

Invalid Lifters.—This is a device which can easily be clamped to any bedstead, by which the invalid can be lifted off the bed and maintained in this position without any exertion to himself or the nurse. The value of



Figs. 125 *and* 126

such an appliance in the nursing of the sick is obvious, and our illustrations (*Figs.* 125 & 126) will be sufficient to show that the method is as simple as it is practical. Another form of the same apparatus is intended only to raise the patient to the sitting posture, or prevent him slipping to the foot of the bed. Under the name of the "Anastasia" it is adapted to hospital wards, as it is mobile and folding, and can be used in turn for any number of beds. There is also another variety of this type which runs on four wheels, so that the patient can be moved to the operating-theatre or bath. Our readers would do well to apply to Mr. A. Skeffington, 49, Ulundi Road, Blackheath, S.E., for further particulars of these really valuable appliances.

Fig. 127.

Intestinal Anastomosis.—Messrs. Allen and Hanburys manufacture the forceps and two metal tubes required to carry out the new method of intestinal anastomosis designed by Mr. Arthur Edmunds, M.S., F.R.C.S., and will give full particulars of the modus operandi to any of our readers who apply.

Irrigators.—*Irrigator for Hydrogen Peroxide.*—Mr. Douglas Lawrie has designed a appliance (*Fig.* 127) by which hydrogen peroxide can be allowed to fall upon a wound or sinus at the rate of about 10 to 20 drops a minute, so that the application can be prolonged over a considerable period. It is a very valuable method of treatment, and this appliance enables it to be carried out more efficiently than is usually the case. Messrs. Allen & Hanburys are the manufacturers.

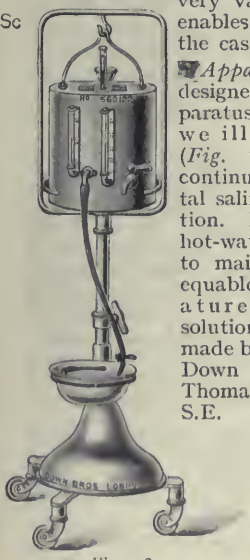


Fig. 128.

Apparatus for Proctoclysis.—Mr. A. E. Wilson Hird has designed the apparatus which we illustrate (*Fig.* 128) for continuous rectal saline irrigation. It has a hot-water jacket to maintain an equable temperature of the solution. It is made by Messrs. Down Brothers, Thomas Street, S.E.

Fig. 129.

Saline Infusion Apparatus.—Adamson's apparatus for intravenous and rectal saline infusion (*Fig.* 129) is a thoroughly practical appliance, very

complete, and costs only 7/6. There is a silver-plated receiver, with 3 feet of tubing, intravenous needle with projecting sheath and aseptic eye, rectal tube fitting on to plated mount, and also a tube of six tablets of sodium chloride for making normal saline solution. The whole is packed in a neat muslinette bag. Messrs. R. Sumner & Co.

Nasal Ointment Irrigator.—This is practically a bottle into which the ointment is placed and then the bottle is boiled. The ointment in its liquid state is then poured into the nose. We doubt if many practitioners will care to take this trouble every time they wish to apply an ointment to the nose. An aseptic oil spray is much more convenient. The Medical Supply Association, Gray's Inn Road, supply this appliance.

Rectal Flushing Tube.—A new pattern of rectal flushing tube has been sent to us by Messrs. Ferris & Co., of Bristol. It is double-channelled and most valuable for purposes of irrigation. This costs 5/–.

Lactic Acid Appliances.—*Lactofermin Apparatus.*—For the preparation of lactic-acid milk, Messrs. Philip Harris & Co., of Birmingham, have produced an appliance which is very simple and practical, and also easily kept clean. The receiver for the milk is of china; this is placed in a metal vessel containing hot water, and the heat of this is retained by a night-light burning within an enclosed chamber. Nothing better could be devised for this purpose, and the whole apparatus only costs 9/6.

Lactic Acid Bacilli.—Messrs. R. Sumner & Co. have discovered that an "Isola" Flask (or Thermos) is one of the most simple ways of preparing soured milk. We came to this conclusion long ago, and have always recommended it. The fact that the Isola Flask only costs 6/6 is an advantage, and the whole outfit with the special thermometer they supply is but 7/6. Their directions for making the culture may be of interest to our readers: "To a tumbler and a half of fresh milk add half a tumbler of water, boil for five minutes, and allow to cool in a covered vessel which is immersed in cold water, until it reaches a temperature of 105° F.—*not lower.* Rinse out the flask, which has previously been thoroughly cleansed, with a little warm water. The object of this is to warm the flask so as not to chill the milk. Now add the culture to the milk, mix with a clean spoon, and pour into the flask. Cork the flask and set aside for ten or twelve hours in a moderately warm room, such as a kitchen, but it must not be left in a position where a cold draught would blow upon it."

Fig. 130.

"Leg Hammock" (The).—This is practically a cheap form of the "Kumfee Leg Rest," which we noticed in our last issue. It was made at the suggestion of the Hon. Sydney Holland for use at the London Hospital, and has since been used in other hospitals. Its great advantage is that it springs to the vertical position directly the legs are removed, so that it occupies no floor space. It also, like the "Kumfee," adapts itself to every movement of the body. It only costs 7/6; and we hear that many practitioners are purchasing it for their own use. The Purpose Manufacturing Co., Teddington.

Lithotomy Crutch.—We show here (*Fig.* 130) a very simple and effective appliance for retaining the patient in the "lithotomy" position during a perineal operation. It secures that the legs and feet of the patient are out of the way of the operator, while the vessels and nerves are not pressed upon. It is designed by Mr. Herbert Tanner, F.R.C.S., and made by Messrs. C. J. Hewlett & Son, Ltd., 35–42, Charlotte Street, E.C.

Nail Nippers (Hollow Beak).—It is very objectionable, when cutting nails, to see the detached portions flying about the room. The hollow beak nail

nipper (*Fig.* 131) obviates this, the piece being imprisoned in the hollow when cut off. Messrs. R. Sumner & Co., Liverpool, supply these at 5/6 each.

Nasal Resection Instrument.—An instrument for submucous resection of the cartilaginous nasal septum has been designed by Mr. Thomas H. Pinder, Manchester Ear Hospital. The usual fixed or swinging blade is here replaced by a fine steel wire (*Fig.* 132). Advantages claimed are, that no sharpening is needed; that a thinner or thicker wire can be used at discretion; and that, in a narrow nostril, the compressible tips are self-adjusting, and the space between them is wide enough to take cartilage of varying thickness. The longer of the two blades should engage the right side of the cartilage first when introduced from the left, as is usually most convenient. The

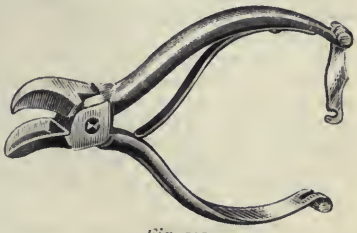


Fig. 131.

Fig. 132.

cut is well under control, and readily follows the outline of the vertical plate of the ethmoid and of the vomer in withdrawing forward. It is made by Messrs. Down Bros., St. Thomas's Street, S.E.

Needles and Holders.—*Needle-holder.*—The needle-holder (*Fig.* 133) made by Mr. Mathieu, 4, Hercules Place, Holloway, N., takes some special Reverdin needles of different sizes and curves. The needle is securely fixed by a central screw at the back of the handle, in any position, so that the same needle can be used on the right or left side, front or back, or at any angle.

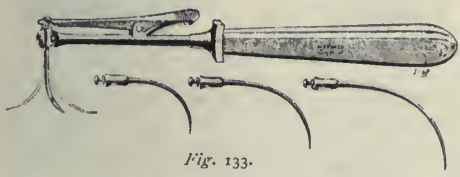


Fig. 133.

We illustrate here (*Fig.* 134) the way in which Messrs. Philip Harris and Co., of Birmingham, supply surgical needles. They put one dozen in a glass tube, which keeps them aseptic and visible. We think it is the best way.

Fig. 134.

Ointment Introducer. — This is made of boxwood, and has a long screw to the piston, which enables the desired quantity of ointment to be forced out, as required. One filling is sufficient for several applications. The Medical Supply Association, 228–230, Gray's Inn Road, W.C.

Operation-table (Portable). — Messrs. Allen & Hanburys make a portable operating-table of varnished oak, which can be packed into a comparatively small size for transport. Complete with lithotomy stirrups and foot-straps, and canvas case, it costs £9 17s.

Oxygen.—Dr. Leonard Hill has contrived a simple and inexpensive oxygen generator which seems likely to prove useful in places where cylinder oxygen cannot be obtained. The apparatus is light and portable, and can be used wherever a pint or two of water can be obtained. It consists of a small metal box—the generator—connected with a vulcanized rubber bag—the breathing bag—holding about fifteen litres, and ending in a rubber mouthpiece. The oxygen is generated out of oxylithe, a peroxide of sodium, on contact with water: thus $Na_2O_3 + H_2O = 2NaOH + O_2$. The caustic soda absorbs the exhaled CO_2. The oxylithe is sold in flat tins containing ten blocks to the pound. Three blocks make a full charge, and yield enough oxygen for fifteen minutes' inhalation. The apparatus is simple to work, and has been tested with success in the high altitudes of Mexico by an engineer who suffered from mountain sickness. It has been useful in mitral stenosis, markedly reducing the irregularity on exertion. The apparatus can also be used for a short exploration of a poisonous atmosphere. It may prove valuable in asthma, but is not likely to be so successful in pneumonia, as the patient using the apparatus requires to compress the mouthpiece with his lips (the nose is closed with a clip), and breathe into the bag. The apparatus is made by Messrs. Siebe, Gorman & Co., 187, Westminster Bridge Road, S.E.

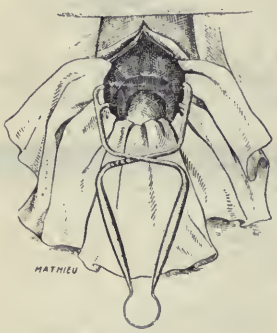


Fig. 135.

Fig. 136.

Retractors. — The instrument shown in *Fig.* 135, made by Mr. Mathieu, 4, Hercules Place, Holloway, N., is entirely of metal, made in one piece only of steel spring. It is adjustable to any size of wound, and is placed and taken out in a second—no assistant being needed. There are no screws or parts to get out of order, while it can be securely fixed at any position, is out of the way of the surgeon, aseptic, and made in different sizes.

Another newly-invented all-metal retractor by Mr. Mathieu for the amputation of the leg is illustrated in *Fig.* 136. When the incision in the flesh is completed all round, the retractor is opened, and placed so that the bone passes in the middle hole while the flesh is retained by the retractor. One assistant pulls the flesh back by the articulated handles, and the bone is left free for the saw of the surgeon. The advantages gained are that no compresses, dressings, or bandages are needed; only one assistant is necessary; and the flap is easier to make. The operation is thus performed in half the time.

Fig. 137.

Scales (Dispensing).—We illustrate in *Fig.* 137 some very inexpensive dispensing scales manufactured by Messrs. Philip Harris & Co., of Birmingham. They are very practical and accurate, and only cost, with all necessary weights, 21/–; or without weights, 17/6.

Shaving Brush.—The Medical Supply Association, 228–230, Gray's Inn Road, W.C., supply an all-metal shaving brush, which can be sterilized in boiling water without injury. This is quite the best appliance for preparing patients for operations.

Scalpel.—A scalpel with rounded end, which Messrs. Down Bros. have made for Mr. Cressy, M.R.C.S., is illustrated in *Fig.* 138. He finds the blunt end to the scalpel a great advantage over the usual pointed one in many operations.

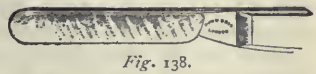


Fig. 138.

Specific-gravity Lever.—The specific-gravity scale or lever is an instrument for easily and exactly ascertaining the specific gravity of a solid, liquid, or gas. It is of especial value for determining the specific gravity of urine, milk, etc. It is more *systematically consistent* than any other instrument in use. The calculation may be made from a quantity of fluid as small as 150 drops, and the scale may be easily read and calculation determined in 20 seconds.

Fig. 139.

Briefly, it consists of a small steelyard (*Fig.* 139) fitted with a very sensitive spirit level. The liquid to be examined is placed in the tube and suspended from the short end of the beam, and the weight on the long arm of the beam is moved until the bubble in the spirit level occupies a central position. The specific gravity is then indicated by the position of the weight on the scale. The instrument registers to four decimal points, which (with the amount of liquid used—150 drops) indicates that it is sensitive to the extent of $\frac{1}{7\frac{1}{5}}$ of a drop. Dr. Savory, Poynt-ington, Fleet, Hants, is the inventor.

Sprayer (Sumner's).—This instrument was originally devised by Messrs. R. Sumner & Co., Liverpool, as a means of spraying ships to remove the parasitic insects which infest them. They have also invented a solution which appears to produce the most marvellous results in the relief of this difficult trouble. But the "sprayer" (*Fig.* 140) is an instrument which should have many uses in medical practice. It is a copper vessel holding a pint of fluid, and it is furnished with an air-pump. By making a series of movements with this pump a sufficiency of compressed air is produced to drive out the solution in a continuous fine stream having considerable force and carrying power until all the solution is utilized. The stream is controlled by a tap. No recharging of air is necessitated because the tap is turned off. In the case of surgical dressings and irrigations this simple appliance is invaluable. We have used it also for giving a fine douche to the spine in cases of spinal irritation. For disinfecting crevices, where a fine stream of water is required, is simply going back to the purpose for which it was designed, and another use we see is the removal of aphides from plants. Wherever a fine stream is wanted which works automatically when the air has been compressed, this appliance will be useful. The solution "D" that Messrs. Sumner & Co. have produced for destroying parasites on ships, can be procured in 5-gallon drums for 16/–. The sprayer costs 17/6.

Fig. 140.

Sterilizer (Macdonald's).—*Figure* 141 illustrates an ingenious arrangement by which both dressings and instruments can be sterilized without becoming wet or even moist. They are placed in the inner cylinder, while the water is boiled in the space between this and the outer wall of the vessel, the water of condensation being prevented from reaching the contents of the inner cylinder by the construction of the lid. It is made in various sizes, ranging in price from £2 17s. 6d. to £8 10s. It can be used with an ordinary gas ring or any form of stove. The Medical Supply Association, 228–230, Gray's Inn Road, W.C., are the manufacturers.

Water Sterilizer (*The Macnair*).—Messrs. Allen & Hanburys supply this useful appliance (*Fig.* 142). It is made to hold two gallons of water, which

Fig. 141.

Fig. 142.

is heated by a "Primus" stove—this costs £2 10s. The camp model is collapsible, and more portable, but only holds a gallon of water—this costs £2 15s.

Stethoscopes.—There are those who still prefer the old single-stem stethoscope. One has now been made with a flexible stem, so that it will fold up and lie flat in the pocket. It is supplied in a neat case by the Medical Supply Association, 228–230, Gray's Inn Road, W.C.

Stethoscope ("*The Wincarnis*").—This is a most ingenious stethoscope invented by Dr. C. Butler Savory. It is on the phonendoscope principle, and admits of the sounds being intensified or diminished by simply altering a nut. The front plate is detachable, and can be destroyed after examining an infectious case, spare plates being provided with the instrument. It is extremely light and portable, and will prove a very serviceable instrument to the practitioner, who will soon recognize its advantages as he comes to use it. Messrs. Coleman & Co., Ltd., of Norwich, supply the instrument.

Supports.—*Leg Support.*—Messrs. J. H. Haywood, Ltd., of Nottingham, have introduced a form of leg support for varicose veins, which is made in the same manner as an elastic stocking, without the elastic, the pressure being obtained by lacing (*Fig.* 143). When the requisite pressure is obtained in this way it does not diminish with wear, and the appliance lasts much longer than an elastic stocking. The only difficulty is the absence of any support to the ankle and foot, which in most cases would have to be bandaged to prevent swelling.

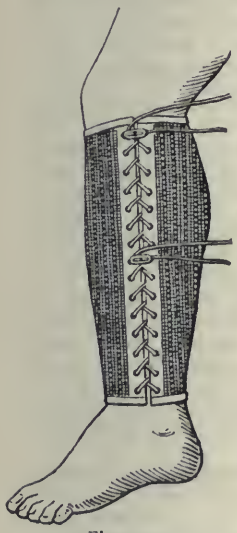


Fig. 143.

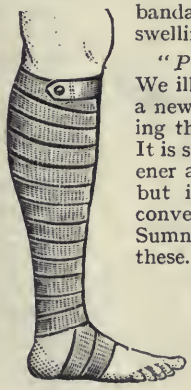


Fig. 144.

"Puttee" Bandages.—We illustrate in *Fig.* 144 a new method of fastening the puttee bandage. It is simply a spring fastener as used for gloves, but it is a very great convenience. Messrs. R. Sumner & Co. supply these.

Fig. 145.

Ambients.—Under this name Messrs. Philip Harris & Co., of Birmingham, have produced a very improved appliance for the treatment of varicose veins. As will be seen from *Fig.* 145, they are made of a woven material which has no elasticity in itself, the pressure being obtained by lacing and also by the use of pressure pads over the part where this is needed. This principle has long been advocated by Murphy, of Chicago (*see Medical Annual*, 1910, p. 713). It is obviously an improvement upon the ordinary elastic stocking, which gives general pressure over the whole limb until it loses its elasticity. The "Ambient" will last an almost indefinite time, and the first cost, 6/6 to 10/6, is not high. The difficulty will be to provide for the ankle and foot, which will usually require support.

"The Costal" Back Support.—An effective back support produced by the Domen Belts Co., Ltd., 456, Strand, W.C. (*Fig.* 146). It is extremely light, and in this respect differs from the heavy surgical appliances which have been designed to support the spine. It will at once be seen that the design is on strictly anatomical lines, and that it gives support without in any way interfering with the proper action of the muscles. We can strongly recommend it, combined with proper exercise, in the case of girls with a tendency to lateral curvature; and also for elderly women who tend to develop deviation of the spine through muscular weakness.

Fig. 146.

Suture Clips.—The method of suturing with metallic clips appears to be growing in popularity, and hence improved appliances have been produced. Messrs. R. Sumner & Co. send us a case which has an ingenious arrangement by which the clips are fixed by a slot arrangement at the extreme end of the spring forceps for approximating the edges of wounds, so that they are in a convenient position for the operator to seize them with the compression forceps at the moment required. The case also contains a special forceps for removing the clips (*Fig.* 147). It is so made that when the jaws of the forceps press the clip in the centre the two ends are raised to an angle which releases them without causing pain. The whole outfit costs 15/–.

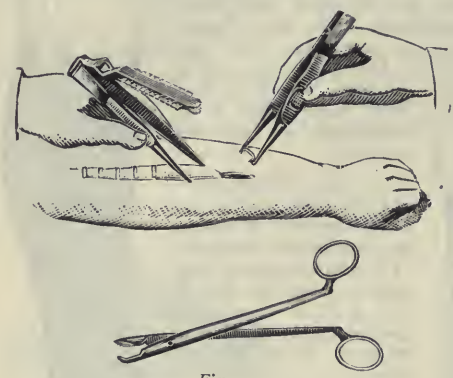


Fig. 147.

Messrs. Ferris & Co., of Bristol, also send us a very excellent case of *Suture Clips*, with a carrier to attach to the forceps, and a special arrangement for removing the clips. The whole is in an aseptic case. The cost is 15/–. We think every practitioner would do well to have one of these cases.

Syringes.—*The "Glasmet" Syringe* for the administration of hypodermic injections, serums, or vaccines, is composed of four parts, which are easily separable for sterilization and can be quickly refitted. The barrel is of glass, but all other parts are of metal. The piston works smoothly and accurately, does not require lubricating, and no washers are used in the syringe, which is graduated both on barrel and piston rod, and the latter is fitted with a regulating screw which limits the amount to be injected. The "Glasmet" syringes are supplied in five capacities, viz., 1 cc., 20 minims, 5 cc., 10 cc., and 20 cc. They may be had with or without needles. The regular needles are of "plug-on" type, and can be supplied in various calibres and lengths, but patent aseptic needles can also be used with the help of an adapter.

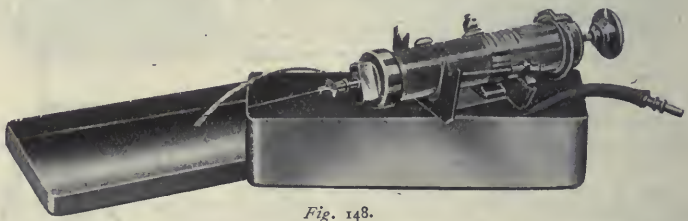


Fig. 148.

Cases for the pocket are supplied as follows: A nickel-plated case, constructed to serve as a sterilizer, and containing the syringe, two ordinary steel needles, and a filling cannula. Cases made of aluminium, also of oxidized gun-metal, which contain an assortment of medicaments for hypodermic use in addition to the syringe and needles, are supplied by the manufacturers, Messrs. Parke, Davis & Co., and it would be difficult to find a more useful emergency case. The syringe is in every way perfect, and the assortment or drugs and ampoules it is possible to carry cover any ordinary emergency. Yet the whole appliance has the appearance of a small cigarette case, and occupies no more space. We can strongly recommend it as both elegant and practical.

The Steromnia Syringe (*Fig.* 148) is an ideal one for all purposes, and is made to contain 20 min., 40 min., 5 cc., and 10 cc. It has no part to go

wrong, and is readily sterilizable. One point we particularly notice: it is not necessary with this syringe to use a large needle because one uses a large syringe. This is a defect of many of the serum syringes we have examined. Messrs. Philip Harris and Co., of Birmingham.

Military Hypodermic Syringe.—This is also supplied by Messrs. Philip Harris & Co., and is a distinct departure in the fitting-up of hypodermic syringes. It is made entirely of metal, and as will be seen from *Fig.* 149, the syringe, five long tubes for latter and the needle-holder, fit into a series of tubes which constitute the case. It is not only very economical as regards space, but very accessible, and such a case would stand an enormous amount of knocking about without damage to its contents. The syringe itself is all metal, with solid metal plunger, and is practical in every way. It costs, fitted complete with pellets and needles, 17/6.

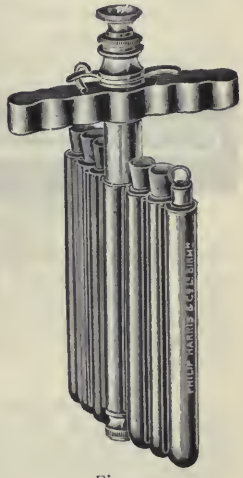


Fig. 149.

Syringe for filling "Ampoules."—A syringe for this purpose has been designed by Messrs. Down Bros., St. Thomas's Street, S.E., as illustrated in *Fig.* 150. Its object is to secure exact dosage.

Antrum Syringe.—Messrs. Ferris & Co. supply a special antrum syringe of the enema pattern. It has a long malleable tube, which gives a wide range of adaptability to any case under treatment. It is quite a practical instrument, and costs 4/6.

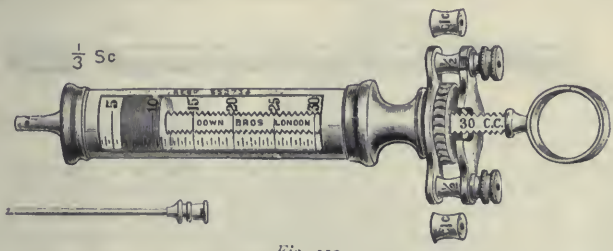


Fig. 150.

Tap Lever.—Mr. Jas. Shaw, M.B., has designed this little appliance to convert an ordinary screw tap into a lever tap, as being more convenient for surgical use (*Fig.* 151). It is made by Messrs. Down Bros.

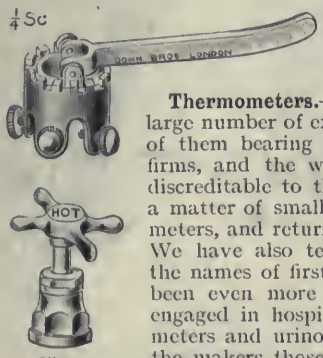


Fig. 151

Thermometers.—During the past year we have made a large number of experiments with clinical thermometers, many of them bearing the names of first-class surgical-instrument firms, and the wide discrepancy between them is absolutely discreditable to those whose names they bear. It would be a matter of small trouble for the firms to test these thermometers, and return to the makers those which are inaccurate. We have also tested a large number of urinometers, bearing the names of first-class firms, and here the discrepancies have been even more remarkable. We would recommend those engaged in hospital work to systematically test the thermometers and urinometers in use at the hospital, and return to the makers those which are markedly inaccurate. It is only in this way that we can make sure of instruments that will

not lead us astray. The fact that nurses usually buy their own thermometers, and buy them cheap, is a great source of clinical error, which it is desirable to prevent.

A New Thermometer Marking.—Dr. Usher Somers' clinical thermometer is easy to read, because each degree is represented by a single figure—98·4 F. is represented by O, and 99° F. by 1, 100° F. by 2, and so on, as will be seen by

Fig. 152.

reference to the illustration (*Fig.* 152). The idea is good, but it requires the act of translating into ordinary degrees, unless a special chart is employed, which has also been prepared. We think the instrument could be improved upon by deleting the front figure on the scale up to 100, and the first two figures afterwards. The thermometer scale would then read :—

N
5–6–7 8 | 9–0–1–2–3–4–5–6–7
or better 5 7 9 1 3 5 7

This would give the single figure, and make reading easier, and also give the exact temperature for charting. These thermometers are supplied by Mr. Jas. J. Hicks, Hatton Garden, E.C.

Thermometer Case.—Dr. F. W. Morton Palmer has designed a thermometer case (*Fig.* 153) with a receptacle for formalin, so that the thermometer becomes

Fig. 153.

automatically disinfected. This is a good idea. It is made by Messrs. Down Bros., and costs 2/6.

Thermometer Case with Tongue Depressor.—This is a thermometer case fitted at the end with a serrated ring-shaped piece which acts as a tongue depressor. It is 6 inches in length, and easily goes into the waistcoat pocket. It is quite a useful thing for the practitioner to carry, and, among other things, it prevents the thermometer case from rolling when laid upon a table. Messrs. Reynolds & Branson, Leeds.

Tractor, A New.—Mr. Penrose Williams has designed a modification of Le Page's tractor. It is larger, and gives better grasp and power. It also holds the blades of the forceps together. This enables traction to be made with one hand alone. *Fig.* 154 will show that it is a very practical instrument. It is made by Messrs. Down Bros.

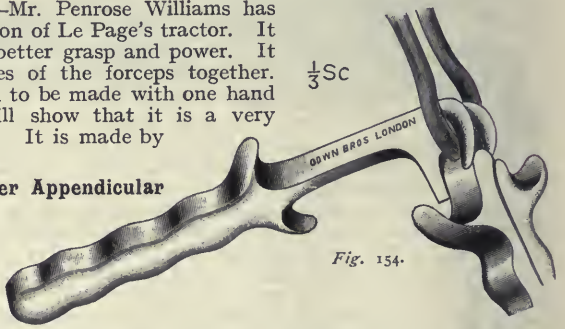


Fig. 154.

Truss for use after Appendicular Operation.—Messrs. Salmon, Ody & Co., 164, Strand, W.C., have done well to provide a truss on their well-known principle for use after the operation for appendicitis. We have carefully examined this truss, and find that it follows every movement of the body, does not shift its

position, and can be adjusted at any possible angle. The girth can be altered to suit the patient, and any size pad can be fitted. It is light, practical, and will meet the requirements of a great number of cases where some support is needed more efficiently than any belt.

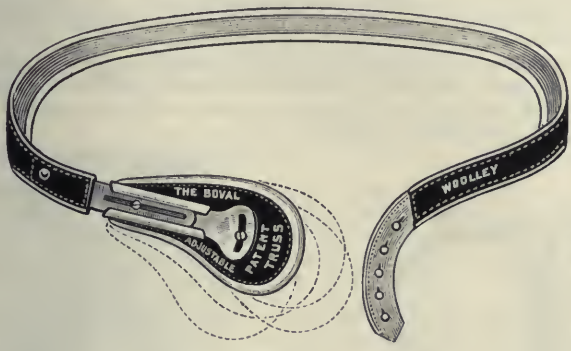


Fig. 155.

The "Boval" Adjustable Truss.—The special feature of the "Boval" Truss (*Fig.* 155) is the combination of a suitable spring with a separate adjustable pad. In order to obtain free movement, the springs are slotted and fitted with a German silver slide, by means of which a pad of any desired shape or size may be attached to the spring. When so fitted the truss may be extended or reduced by about 1½ inches, and the pad raised or lowered as required. It is claimed that these movements have, to a large extent, disposed of the difficulty of accurate adjustment, and this has been confirmed by a large number of testimonials from members of the medical profession. The pads are not only adjustable but interchangeable, and consequently may be renewed or replaced at any time without the necessity of a new spring. Further, in fitting a truss, any desired shape or size of pad may be used. These features are of immense advantage to surgeons when fitting. Messrs. Jas. Woolley, Sons & Co., Ltd., Manchester.

Fig 156.

Urinary Test Case (Pocket).—Messrs. Allen & Hanburys make a very convenient and portable test case for urinary examination (*Fig.* 156). It

measures 4 by 3 by 1 in., and contains everything necessary for an ordinary examination. In nickel-plated case, 12/6 or 17/6, according to quality.

Ureometer (Harris's Improved).—We illustrate here (*Fig.* 157) a new ureometer produced by Messrs. Philip Harris & Co., of Birmingham. It simplifies the estimation of urea, as only a few minutes are required to perform the experiment, and the result, when subsequently read off the index, has only to be compared with a table which is supplied, to give the percentage of urea and the exact number of grains to the ounce which it represents. It saves time and calculation, and makes an important line of clinical investigation easier; we therefore welcome it.

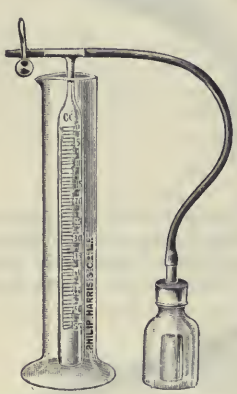


Fig. 157.

Fig. 158.

Vaporizer.—Under the name of the Vaporyl Lamp, Messrs. Philip Harris & Co., of Birmingham, produce this simple but strongly-made appliance (*Fig.* 158) at 5/– a dozen. We constantly want a cheap article of this kind, and our readers may be glad to know of it.

Waterproof Pocket.—Messrs. Reynolds & Branson send us a sterilizable waterproof pocket, suggested by Dr. Woodcock, of Leeds, and intended for the use of phthisical patients. It is inexpensive, and quite practical.

PROGRESS OF PHARMACY, DIETETICS, &c.

Aluminii Acetatis Conc. (Liq.).—A recent paper by Dr. Waterhouse (*Brit. Med. Jour.*) has directed attention to this agent as an antiseptic, and it is being extensively employed. Messrs. R. Sumner & Co., of Liverpool, supply the liquor in concentrated form at 1/– per lb.

Amido-Azotoluol, regarded as the active constituent of "scarlet red," has been used with excellent results for promoting and stimulating skin formation upon wounds. It is less irritating than scarlet red. The "Scarlet Ointment" of Prof. Schmieden is a vaseline ointment containing 8 per cent of this substance. Messrs. Chas. Zimmermann & Co., St. Mary-at-Hill, E.C.

Analgesicum (Lin.) (Gadd).—This contains camphor, menthol, methyl salicylate, etc., and gives rapid relief to pain in case of lumbago, rheumatism, neuralgia, etc. It is applied in the form of a paint and quickly covered with warm flannel. Messrs. Evans, Gadd & Co., Bristol and Exeter.

Antilusin.—The presence in normal serum of antitryptic enzymes suggested the utilization of these to raise the immunity of the cells exposed to the eroding action of the gastric juice, and to promote the repair of existing ulcers. Under the above name, Messrs. Allen & Hanburys supply a preparation from which the proteolytic enzymes have been removed and the antiferments concentrated into a small bulk. They are given by the mouth.

Aphrodine Chloride.—Messrs. Chas. Zimmermann & Co., now put up this preparation in the form of ampoules each containing 0·01 gram.

Arseno-Benzol.—Messrs. R. Sumner & Co., of Liverpool, have sent us a complete outfit for the administration of "606." It renders the treatment possible to the general practitioner.

Arthigon.—A gonococci vaccine, representing an aqueous emulsion of killed gonococci, has been produced under the above name by Schering. It has been used with success in cases which resist other treatment. It can be obtained, together with full particulars as to mode of administration, from Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Balmosa.—An improved form of lin. analgesic. It is issued as a semi-solid cream of the nature of the toilet preparations resembling snow. It contains methyl salicylate, a camphoraceous base with rubefacients; the basis forms an ideal lubricant for massage, and does not leave grease on the skin; it promotes the rapid absorption of the methyl salicylate, and thus the preparation exhibits remarkable activity in the treatment of rheumatism, muscular pain, etc. It is prepared by Messrs. Oppenheimer, Son & Co., Ltd., 179, Queen Victoria Street, E.C.

Barbonal and Barbonal Soda.—Under these names Messrs. Ferris & Co. have produced preparations of diethylbarbituric acid and diethylbarbiturate of sodium, which are better known by the names of "veronal," and "malourea," etc. The sodium salt has the great advantage of being soluble in water. The cost of either of these salts is 4/– per ounce, and they can be obtained also in tablets of 5 and 7½ gr. in bottles of 25, 100, and 500.

Benzosalin appears as a white crystalline powder, with a slight odour and taste. It consists of 54 per cent of salicylic acid and 48 per cent of benzoic acid, and is insoluble in the gastric juice, but is split up quickly in the small intestine. It has proved useful in rheumatism—articular and muscular—also as an intestinal antiseptic. Frequently it gives good results in the general relief of pain. The dose is 5 to 15 gr. three times a day. The Hoffmann-La Roche Chemical Works, Ltd., 7 & 8, Idol Lane, E.C.

Bismuth Subgallate Co.—Suppositories containing bismuth, resorcin and zinc oxide are an excellent remedy for hæmorrhoids and irritable states of the rectum. They are made by Messrs. Reynolds & Branson, Ltd., Leeds, who also supply cremor bismuthi subgall. co., which is very useful in pruritus, the base being non-greasy.

Borovertin appears as a crystalline powder, soluble in water, with slight taste. It contains 51·5 per cent of hexamethylenetetramine and 48·5 per cent of boracic acid, and has proved useful as a non-irritating urinary antiseptic in cases of cystitis, having the effect of reducing the alkalinity of the urine. It is less useful in the cystitis of gonorrhœa. Dose 1 to 4 grams after meals. Messrs. Chas. Zimmermann & Co., 9 & 10, St. Mary-at-Hill, E.C.

Bougies (Medicated).—Under the name of "Sil-Mer-Zincs," bougies have been produced which offer many advantages for the application of silver iodide to the urethra. They are cleanly, easy to apply, cause no pain, and can be retained in the urethra for a long time without discomfort. Manufactured by Dr. Charles L. Mitchell, they have great advantages over many other forms of bougies, because they will stand considerable handling, and

experiment has proved that even when exposed for one month to the rigours of an Indian climate they have remained in perfect condition. Messrs. Thos. Christy & Co., Old Swan Lane, London, E.C., are the agents.

"Brusson Jeune" Products.—We mentioned last year the bread made by this firm, as primarily intended for diabetic patients, and being more palatable than most gluten foods. This has led to its use by many physicians in cases of gout, obesity, etc., when starch is contraindicated, the point being that such patients will eat this bread, whereas it would be useless to order ordinary diabetic foods. This firm also make a number of cereal preparations which are not starch-free, but by the addition of gluten during manufacture are richer in this substance than any similar food. Farine au Gluten is a flour with added gluten. Macaroni au gluten is a macaroni with gluten added. It is the most nutritious as well as the nicest product of its kind we have tasted. Under the names of vermicelle au gluten, and nouilettes, semoule au gluten and petites pâtes, gluten granules, they put up vermicelli, semolina, and macaroni in various seductive forms, with gluten added. In searching for some new article of diet for the invalid, these preparations are quite a discovery. The Brusson Jeune Establishment, Bedford Chambers, W.C.

Calcium Salts.—In addition to palatinoid calcium permanganate mentioned in the *Medical Annual*, 1910, Messrs. Oppenheimer, Son & Co. put up palatinoids of calcium lactate and pulverettes of calcium iodide. The lactate is given to increase the coagulability of the blood in very many diseases, in various forms of hæmorrhage, serum rashes, and other skin complaints. The salt depreciates in therapeutic value when exposed to the air; therefore the palatinoid is a good method for its exhibition. We would suggest that one-third of a tumbler of water should be given after each palatinoid. Calcium iodide has been lately used with considerable success in the treatment of diabetes, and the palatinoid method of administration is an excellent one, as the drug is both nauseous and unstable when exposed to the air. It should be followed by a drink of water.

Elixir Calcii Iodid. (*Ferris*) contains 2½ gr. in each fluid drachm, and is a palatable preparation, without sugar, prepared by Messrs. Ferris & Co.

Calefaciens (Unguentum).—This contains capsicum, chloroform, etc., and has remarkable calefacient properties. It is nicely prepared, and rubs well into the skin, and is good to prescribe in cases of muscular rheumatism. Messrs. Duncan, Flockhart & Co., Edinburgh.

Calmine is the sodium salt of the acid best known as veronal. It has the advantage of being soluble in water (1–5). For this reason it acts more promptly and is more rapidly excreted. It can be administered subcutaneously or per rectum, and is an efficient hypnotic in doses of 5 to 8 gr. It costs 4/– per ounce, and is made by The Crown Chemical Works, Ltd., 63, Crutched Friars, E.C.

Carlsbad Salts.—We need not draw attention to the value of the natural Carlsbad salts, not only as an occasional laxative, but as a valuable systematic treatment in the gouty diathesis; but unless the "Natural Carlsbad Sprudel Salt" is specified, the patient gets one of the numerous artificial imitations, which are not in any way comparable in therapeutic efficacy with the salts prepared by evaporation of the natural water. It is just one of the prescriptions in which the physician should be particular to ascertain that the patient gets what he orders. Messrs. Ingram & Royle, Ltd., 26, Upper Thames Street, E.C., are the agents.

Ceridin.—Prof. E. Roos found the therapeutic action of yeast to be due entirely to a fatty substance, which in collaboration with Dr. Hinsberg he succeeded in isolating. It exists to the extent of about 3 per cent in a good specimen of fresh yeast, and is known commercially as ceridin. It is of value in furunculosis, acne, and similar skin diseases. It is of uniform activity, permits of accurate dosage, and does not cause secondary disturbance owing

to fermentation, in contradistinction to yeast. Given regularly, it has a slightly laxative effect, and remarkable results are reported of its use in acne. Ceridin is issued in palatinoids each containing ceridin 1½ gr.; and in cocoids (tiny pastilles of chocolate which masks the taste of the medicament) each containing ceridin ½ gr.: the latter are convenient for children. Messrs. Oppenheimer, Son & Co., Ltd., 179, Queen Victoria Street, E.C.

Charcoal Biscuits.—Messrs. Alex. Robb & Co., of 79, St. Martin's Lane, W.C., make charcoal biscuits which are very palatable and easy of digestion. They form one of the very best methods of administering charcoal in cases of flatulence and dyspepsia. The "Digestive Rusks" made by the same firm are also very useful iu the treatment of cases where bread is contra-indicated; they are a change from toast, much more palatable, and are prepared both sweetened and unsweetened. The "Water-biscuits" prepared without sugar are also very useful as a change when a strict diet is ordered.

Cheese, The "Valier."—Cheese is a most valuable food, especially in cases where the quantity of meat allowed has to be reduced. Many patients complain that cheese is indigestible, and this is true of many makes. It is necessary to specify the particular cheese when ordering it as an essential part of the diet of an invalid. One of the best, for this purpose, is "Valier" cheese, made at Purton, in Wiltshire, by Mr. W. H. Robson. This is not only one of the most palatable cheeses we have tasted, but is submitted to a special process during its manufacture, which renders it not only easily digested but readily assimilated. We should like our readers to try samples of it, and feel quite sure that they will join us in the view that it can be cordially commended for use even by our most dyspeptic patients.

Chocolate (Sugarless).—Messrs. Callard & Co., 74, Regent Street, W., who are continually making fresh efforts to make the diet of the diabetic less trying, have introduced a pure chocolate, of a very palatable character, which is wholly free from sugar. This will be appreciated not only by the diabetic, but by our gouty and dyspeptic patients, and also by those who suffer from too much flesh. The absence of sugar is here a real improvement, as the natural taste of the chocolate is not interfered with, and it rather stimulates the appetite than otherwise. We are sure that it only requires to be widely known to be generally appreciated by those who like the flavour of chocolate in its purest form. We mentioned in our last issue that Messrs. Callard & Co. make sugarless marmalade and also jams which are almost free from sugar. They have also a starch-free bread which is more palatable than most of its kind. This is called "Prolacto" Bread, and contains 33·85 per cent of albuminoids and 17·36 per cent of fat. It is very nutritious.

Chologestin is a remedy which has been employed with satisfactory results for biliary troubles due to hepatic insufficiency, with the resultant intestinal fermentation, and in severe cases of jaundice. A tablespoonful contains sodium glycocholate 2 gr., sodium salicylate 2½ gr., pancreatin 5 gr., sodium bicarb. 5 gr. It is prepared in a palatable form and given well diluted with water. Messrs. Thos. Christy & Co., Old Swan Lane, E.C., are the agents.

Cicatricine is a combination of thiosinamine and antipyrin prepared by Mr. W. Martindale, 10, New Cavendish Street, W. The antipyrin, like the salicin and iodine of other preparations, appear to be added to make the thiosinamine more soluble. Personally we find no fault with the solubility of thiosinamine, and prefer to use it *unmixed*. There is no advantage in concentrated solutions, but rather the reverse. Solutions of thiosinamine 1 gr. to 1 dr. with injections up to 2 dr. (intramuscular) give no pain and leave no hard swelling behind.

Cofectant Membroids.—These contain "an insoluble (and therefore non-toxic) preparation derived from coal-tar," and are intended as an intestinal antiseptic in cases of chronic catarrh. The same preparation is also supplied in the form of lozenges. Messrs. Evans Sons Lescher & Webb Ltd.

Devules.—This is a name given by Messrs. Oppenheimer, Son & Co. to a new method of supplying photographic developers. It is practically a large bipalatinoid containing the uncompressed powdered developer in two separate chambers; this separation prevents spoiling. The devule may be opened instantly with the fingers, and the contents being in a fine powder dissolve readily; they need no crushing like compressed tablets, the air-tight covering prevents deterioration, and the non-actinic red coating avoids light action. The convenience of being able to prepare *instantly* small quantities of fresh, active developer must be tried to be realized. Devules are prepared containing pyro soda, metolquinæ, glycin, amidol, etc. They will prove invaluable to the medical photographer, especially when on a holiday.

Digalen.—Since our favourable report of this substance, which may be described as a soluble digitoxin, in our last issue, we have made extensive use of it in practice. We find that while it produces all the therapeutic effects of digitalis with marked certainty, it does not cause the gastric irritation which so frequently accompanies the use of the crude drug. We can cordially recommend it to our readers as one of the best methods of administering digitalis in cases where it is indicated. The Hoffman-La Roche Chemical Works, Ltd., 7 & 8, Idol Lane, E.C.

Dionine.—It is claimed for dionine that it is an analgesic and sedative which has all the valuable therapeutic properties of morphia without any of its deleterious after-effects. It does not induce craving, is free from cumulative action, and as its aqueous solutions are neutral it may be injected hypodermically without pain. It has been found most useful in the treatment of the morphia habit as well as in cough, and in controlling various painful conditions. Dionine is also recommended as an analgesic, antiseptic, and lymphagogue in ophthalmology. Mr. E. Merck, 16, Jewry Street, E.C.

Diplosal.—This new salicylic preparation may be regarded as acetyl-salicylic acid with the acetic acid radicle replaced by a salicylic acid group. Its therapeutic action is identical with salicylic acid, except that it is free from the irritative effects of the free acid, owing to its slight solubility in water. When swallowed, it passes the stomach practically unchanged, and is split up and absorbed in the intestines. It is eliminated chiefly in the urine as salicylic and salicyluric acids respectively, traces only being found in the fæces. It is extremely well tolerated, no toxic symptoms, digestive disturbances, albuminuria, tinnitus, etc., ever appearing. The indications are the same as for salicylic acid, especially acute and chronic articular and muscular rheumatism, sciatica, neuralgia, etc. It is also a valuable urinary antiseptic (for reasons given above) in cystitis, urethritis, etc. Continental reports show that this drug is well tolerated, it does not disturb digestion or cause nausea, nor does it produce toxic symptoms even in large doses. The dose is 7½ to 15 gr. in single doses, 30 to 60 gr. or more per day. Diplosal is best given in palatinoid or pulverette form owing to its insolubility. Both forms are prepared, each containing 7½ gr. diplosal, by Messrs. Oppenheimer, Son & Co. Ltd.

Ergoval (Woolley) is a physiologically standardized fluid extract of Ergot prepared by Messrs. Jas. Woolley, Sons, & Co. Ltd., of Manchester. One dr. is equal to 60 gr. of ergot. It is a very reliable preparation in every case where ergot is indicated.

Ether Anæsthetic.—This is much preferable to the ordinary methylated ether for anæsthetic purposes. It has a specific gravity of 0·720, and is free from all impurities. Messrs. Reynolds & Branson Ltd., Leeds.

Eumenol.—Under this name Mr. E. Merck has introduced a fluid extract of tang-kuai, which has been highly recommended as an effective emmenagogue. It is non-toxic and has no abortive action.

Fer Ascoli is a compound of iron with nuclein. It has the advantage of being well tolerated by those who cannot take preparations of iron. It appears to aid rather than hinder digestion, and is well borne when the gastric mucous membrane is very irritable. The clinical results of its effect upon the hæmoglobin and red corpuscles give decisive evidence that it is a very valuable agent in the treatment of anæmia and all conditions where the supply of hæmoglobin is deficient. It is supplied by Messrs. Allen & Hanburys.

Ferment Diagnosticum is a solution of glycytryptophan, and is used for its chemical proof of ferments *only* appearing in the carcinomatous stomach. This enables a more certain diagnosis to be made of cancer of the stomach. Full particulars of the method of using this agent can be obtained from Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Ferratin is an organic combination of iron with albumin, containing 6 per cent of the metal; it is identical in chemical composition with the iron present in animal tissues, and was discovered by Professor O. Schmiedeberg, M.D., who first demonstrated the presence of an iron albuminate in the liver of mammals, and then produced the substance synthetically under the above title. By means of ferratin the organism may be supplied with iron in cases of defective assimilation and diminished blood-production, and in these conditions it must be regarded not only as a curative agent, but as a nutrient, owing to its albumin content. Ferratin is easily absorbed and assimilated, and will not disturb the digestive functions or cause constipation. The most convenient method of administering ferratin is in cocoids (small pastilles of chocolate in which the taste of the drug is effectually disguised). They are prepared in two strengths, gr. 5 and gr. 2½, by Messrs. Oppenheimer, Son & Co., Ltd.

Fibrolysin.—Mr. E. Merck produces a salicylate compound of thiosinamine which is neutral and sterile. As is well known, it exercises pronounced resolvent properties on all kinds of pathological scar tissue, and accordingly it has been found of great value in the treatment of adhesions, ankylosis, Dupuytren's contraction, keloids, rheumatoid arthritis, strictures, scars following burns, etc. For the treatment of superficial fibrous tumours, scars, and keloids which are covered only with a thin layer of epithelium, Fibrolysin Guttaplast, also prepared by Mr. Merck, is convenient.

Filmaron.—The anthelmintic properties of filmaron, the active principle of male fern, have been demonstrated by Jaquet, of Basle, after physiological tests, to be free from the toxic effects often produced by the ordinary ethereal extract of the crude drug. Filmaron is administered in all cases where ethereal extract of male fern is indicated, i.e., tænia, ankylostomum, ascarides, etc. In a dry condition, filmaron has a great tendency to cake together. This, added to its insolubility in ordinary solvents, renders its administration difficult. By far the best method of giving it is dissolved in oil, and enclosed in palatinoid form it is thus rendered tasteless, is easily swallowed, and its activity is unaffected. The dose is from one to three palatinoids, according to the age of the patient. Messrs. Oppenheimer, Son & Co., Ltd.

Formalets.—Under this name Messrs. Evans Sons Lescher & Webb Ltd., supply tablets containing formaldehyde and ol. menth. pip. as throat disinfectants. They prepare them in bulk for dispensing at a much lower cost than many similar preparations are supplied.

Formosyls (Perfumed) are saponaceous solutions of essential oils, origanum, thyme, eucalyptus, sassafras, etc. They are fully germicidal, and can be used for disinfecting the hands and instruments, and are pleasant to use. They are made by Mr. W. Martindale, 10, New Cavendish Street, W.

Gelatina Sterilizata.—Mr. E. Merck prepares a sterile 10 per cent solution of gelatin under this name, which has been found very useful in the treatment of hæmoptysis, gastric and intestinal hæmorrhage, and hæmophilia.

Grindeliæ Co. (Elixir) has been specially prepared by Messrs. Jas. Woolley, Sons & Co., of Manchester, for the treatment of asthma. Each fluid drachm represents : Ext. grindeliæ liq., 12 min. ; Potass. iod. 2 gr. ; Trinitrin $\frac{1}{200}$ gr. It is a preparation of great clinical value both in asthma and whooping-cough, as it both checks the spasm and relieves the catarrh.

Grindeline.—A combination of grindelia robusta, potassi. iod., and tr. nitrosi, prepared by Messrs. Oppenheimer, Son & Co., which has proved of great use in many cases of asthma.

Guaiacose may be described as a food and drug combined. It is a 5 per cent solution of guaiacol-calcium sulphonate in liquid somatose. It is a really invaluable remedy in diseases of the lungs and air-passages. Rosenbach considers that guaiacol-calcium sulphonate is the best of the guaiacol salts, because it is soluble and non-irritating, while the calcium assists the healing process and strengthens cardiac action. Somatose is an albumose material derived from beef. The result of the combination is that the patient is fed, while the appetite and assimilation are improved. It is a medicament which we can recommend in every case of phthisis or tuberculosis, and also in cases of *real* rheumatoid arthritis. It is prepared by the Bayer Co. Ltd., 19, St. Dunstan's Hill, E.C.

Hegonone is a new silver albuminous preparation made by the action of ammonia silver-nitrate solution upon albumose. It is prepared by Schering, and has been used by Dr. Klingmüller, of Kiel University, in the treatment of gonorrhœa, with great success. It is easily soluble in water, and is of alkaline reaction, containing about 7 per cent of organically bound silver. Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C., are the agents.

Heroin et Thymi Co. (Mist.) contains heroin, apomorphin, ext. thymi fluid, and tolu, and is very useful as a soothing expectorant in cases of bronchitis and phthisis. Messrs. C. J. Hewlett & Son, Ltd.

Hormonal.—Dr. Zuelzer claims that normal peristalsis is caused by a specific cell product which is chiefly stored in the spleen. This cell product is now prepared by Schering under the above name. It is claimed that when injected intramuscularly it is curative even in cases of chronic constipation. Many favourable reports have appeared in German literature. Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Iodipin is a chemical combination of iodine with sesame oil, and forms a perfect substitute for the alkali iodides. It is very gradually absorbed by the system, and so induces a continuous and regular iodine medication free from any disagreeable after-effects. When injected subcutaneously, it allows of very large doses of iodine being given without the production of iodism, and accordingly provides the treatment *par excellence* for tertiary syphilis and allied disorders. Iodipin is supplied as a 10 per cent solution for oral administration, a 25 per cent solution for subcutaneous injection, and in tablets for internal use, by Mr. E. Merck, 16, Jewry Street, E.C.

Lactic-acid Bacillus, Local Application of.—The use of the lactic-acid bacillus as a local application in cases of atrophic rhinitis, ethmoiditis, otitis media, tuberculous sinuses, cystitis, leucorrhœa, and gonorrhœa, has been extensively employed during the past year. A strong culture of the lactic-acid bacillus is put up in ampoules for purposes of injection or douching by Messrs. R. Sumner & Co., of Liverpool. The results largely depend upon the freshness of the culture, as such preparations rapidly deteriorate. A fresh culture is made in every case. The theory is that the vigorous strain of the lactic-acid bacillus renewed persistently for some days is able to dispossess and displace the organisms of disease. Ampoules of 20 cc. cost 1/–. The treatment is well worthy of a trial.

Lactic Bouillon.—There are many adults who cannot digest milk, and perhaps more who find soured milk badly received by the digestive organs.

It seems, therefore, a good idea to use peptonized essence of beef in the form of bouillon as a vehicle for the lactic-acid bacillus. Messrs. Sumner & Co., of Liverpool, have adopted this method, and so far as our trials have gone, it is not only well tolerated, but appreciated by the patient. It is put up in 8-oz. bottles, which should not be kept longer than one week, and the contents of the opened bottle should be consumed the same day. It is easy to order a regular supply to be delivered during the course of treatment. The cost per bottle is 1/6.

Lavettes.—A dainty form of toilet soap powder which may be described as a tablet-like envelope of tinfoil containing a powder. When squeezed into the palm of the hand and wetted they produce an abundant, creamy lather. They are issued perfumed or plain, and may be had medicated if desired, in dainty boxes which may be carried in the waistcoat pocket, and in addition to their convenience they have the advantage of being very cheap. They are prepared by Messrs. Oppenheimer, Son & Co., Ltd.

Leucofermantin is a sterile normal animal blood-serum with a very high antitryptic index, and is therefore particularly suitable for the treatment of all "hot" suppurative processes which lead to abscess formation. It rapidly and completely inhibits the secretion of pus, arrests necrotic processes, and promotes the formation of granulation tissue. Prepared by Mr. E. Merck.

Lombricine is one of those elegant preparations with which the French pharmacist supplies us. It is a specific for intestinal worms. It has an agreeable taste, and does not constipate, but rather acts as a mild laxative. The syrup is prepared from plants of the artemisia, absinthium, and fucus families, concentrated in vacuo and with sugar added. Its use should be continued for three days, night and morning, in doses of half a teaspoonful to a tablespoonful, depending upon the age of the patient. It not only cures the worms, but acts as a tonic to the general health of the patient. The British agents are Messrs. Roberts & Co., 76, New Bond Street, W.

Lymphoid Compound (Lowenthal).—The following is given as the formula of this preparation: Extract lymphatic glands, testes, brain and spinal cord, āā gr. 2; Glycerophosphate of iron, gr. ½; Glycerophosphate of sodium and calcium, gr. 2; Strychnine nit., gr. $\frac{1}{60}$; aloin, gr. $\frac{1}{20}$. It is claimed to exercise very remarkable effects in cases of neurasthenia, depression after influenza, melancholia, etc., when given in capsules, or in the form of "lymph serum," which is administered hypodermically. The capsules are supplied at 25/- per 100, and 36 ampoules for injection are supplied for £5 5s., by The British Organotherapy Co. Ltd., Carlton House, Lower Regent Street, S.W., who will furnish literature upon the subject.

Malt.—*Ferrated Malt* is a combination of malt extract with phosphates of iron, quinine, and strychnine. Made by Messrs. Reynolds & Branson, of Leeds.

Under the name "*Zymalt Hæmatic*," Messrs. Ferris & Co. supply a preparation of the digestive enzymes of malt in combination with hæmoglobin.

Milk Cocoa.—Messrs. Allen & Hanburys make a pancreatized combination of milk and cocoa, so that only the addition of hot water is necessary to make a cup of cocoa which is not only very palatable, but easy of digestion. It is valuable in the sick room, and especially when the patient wakes in the night. They also prepare a milk chocolate which is wholesome, palatable, and nutritious. Patients who require something between meals will find it a very useful thing to carry in the pocket.

Milk Food (Woolley).—The Milk Food manufactured by Messrs. Jas. Woolley, Sons & Co. Ltd., of Manchester, as nearly approximates human milk as possible. It is prepared for use by mixing it with cold water to form a paste, and then sufficient hot water to make the desired quantity. It is

intended for infants up to six months, and will be often found of great use when cow's milk disagrees or ferments. It is an absolutely reliable preparation.

Milk and Glycerophosphate.—This is prepared by Mr. W. Martindale, 10, New Cavendish Street, W. It is made of full cream, dried milk, with glycerophosphate added, and is given in half-ounce doses, mixed with 4 to 5 oz. of hot water. It makes an excellent tonic, very nutritive and restorative.

Nastin.—A booklet giving the latest reports upon this interesting remedy for leprosy can be obtained on application to Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Nutrient Media.—Messrs. Burroughs Wellcome & Co., put up the following media in a dry form, in small tube, for bacteriological examinations, when only a few tubes are required.

Nutrient broth, agar-agar, and bile-salt agar-agar. The last is useful for the isolation of intestinal bacteria, such as *B. coli*, and the organisms of typhoid and dysentery, from water, milk, fæces, urine, etc. It contains bile salt, peptone, lactose, and neutral red. The bile salts inhibit the growth of most bacteria other than those of intestinal origin. The *B. coli* colonies are red, but the colonies of *B. typhosus* and *B. dysenteriæ* are colourless. The temperature of incubation recommended by MacConkey is 42° C.

Opsonogen.—This is staphylococcus vaccine, and is useful in all cases when this vaccine is indicated. Messrs. Chas. Zimmermann & Co., 9 & 10, St. Mary-at-Hill, E.C., are the agents.

Parasiticum Ung. is a saponaceous antiseptic ointment having strong germicidal properties. It is specially valuable as an application to verminous heads, in parasitic skin diseases, in ringworm, and also in chronic eczema. Prepared by Messrs. Ferris & Co., Bristol.

Paskets.—Under this name Messrs. Chas. Midgley Ltd., 17, St. Ann's Square, Manchester, have put up a series of medicated lozenges, which they have taken great care to make neither too hard nor too soft, and which, while they dissolve slowly in the mouth, are agreeable to the taste. We have personally examined paskets of red gum, bismuth carb. gr. ½, and hyd. c. creta gr. 1, and find that they form a very suitable method of administering drugs, and especially those which it is desired to keep long in contact with the throat and upper air-passages, such as menthol and cocaine, chloride of potash, borax and cocaine, carbolic acid, codeine, etc.

Perhydrol.—Under this name Mr. E. Merck has produced a solution of hydrogen peroxide containing no less than 30 per cent by weight of H_2O_2, and yielding 100 times its volume of oxygen on dissociation. Further, it is absolutely free from acids, and chemically pure. Perhydrol is immeasurably superior to ordinary commercial hydrogen peroxides, which usually contain considerable quantities of acid, and rarely can be made to yield even the 3 per cent they are supposed to contain. It is therefore the ideal disinfectant for the general practitioner as well as for the operating surgeon.

Zinc-perhydrol contains 50 per cent ZnO_2, and forms a good dressing for incised and contused wounds, burns, etc. It is absolutely innocuous and non-irritant, whilst its antiseptic and healing powers are very prominent.

Magnesium-perhydrol is a white, tasteless, and odourless powder, and is supplied in two strengths, containing 15 per cent and 25 per cent MgO_2 respectively. Tablets of 7½ grs. of the 25 per cent strength are supplied, and will be found very convenient for internal administration. Magnesium-perhydrol is indicated in flatulence, fermentative processes in the stomach, gastric catarrh, diarrhœa due to hyperacidity of the stomach, and allied conditions.

Phenoloid Disinfectant.—This contains 66 per cent phenoloid, with high carbolic-acid coefficient. It forms a creamy white emulsion when diluted

with water. It is prepared by Mr. W. Martindale, 10, New Cavendish Street W., and sent out in a very ingeniously-shaped and distinctive bottle.

He also now makes a *Thymol Disinfectant.* It has been proved that thymol is exceptionally potent against *B. coli.* It has a carbolic coefficient of 10·4. When diluted it forms an opalescent emulsion. Both these preparations can be commended as reliable.

Pinheroin Pastilles have been produced by Messrs. Oppenheimer, Son & Co. Ltd., and are quite an ideal thing for the irritative useless cough that annoys the producer, and also the unwilling listeners. Each pastille is the equivalent of ½-dr. dose of pinheroin, i.e., terpin hydrate gr. ½, with heroin hydrochlor. gr. $\frac{1}{50}$, and essence of Canadian pine. They are pleasant to the taste, and their gradual solution in the mouth enhances the local effect of the medicaments, whilst the demulcent basis increases the efficacy of the active ingredients.

Piperazine Citrate.—Opinions vary as to the value of piperazine as a uric acid solvent in clinical practice, but we believe this is due very largely to the variations of the preparations of piperazine on the market. The dispensing of piperazine presents difficulties owing to its very hygroscopic and volatile nature. Messrs. Alfred Bishop Ltd., of 48, Spelman Street, N.E., after exhaustive experiments, showed that the citrate was the best way to fix the base in a permanent form. It is when the salt is used that satisfactory results are obtained both in the treatment of gout and renal calculi. We think it is distinctly advisable, when prescribing piperazine, to specify the citrate of piperazine (Bishop), as there are many unreliable preparations on the market, because while originally properly compounded, they have lost their active properties by the action of moisture and the CO_2 of the atmosphere. Like Bishop's citrate of caffeine and lithia, it is an absolutely reliable preparation.

Pituitary Fluid (Duncan).—Messrs. Duncan, Flockhart & Co., make a very reliable preparation of pituitary fluid which is being increasingly used in obstetric complications and for post-operative shock. Its action in causing prolonged uterine contraction with increased blood-pressure is most valuable. In addition to its power of stimulating the involuntary muscles, it has some action as a diuretic. It is a decidedly useful remedy for the emergency case.

Proteolytic Fluid.—Under this name Messrs. Duncan, Flockhart & Co., of Edinburgh, have prepared a combination of the gastro-intestinal enzymes in a neutral serum. It has a delicate, piquant taste, and acts as an appetizer when given before meals. It is indicated in all conditions of atonic dyspepsia, and is a most valuable addition to our resources in dealing with such conditions. It is the result of much study of the enzymes necessary to supply in these cases, and the name of the firm is a guarantee that its manufacture is perfect in every detail.

Prunelline is a French preparation, made from the juice of prunes and apples, honey, and manna. It is a palatable and very mild laxative, very suitable for infants, children, and delicate invalids. It can be given in doses from one teaspoonful to two tablespoonfuls, according to requirements and the age of the patient. It is free from the effects of drugs used for constipation, and does not irritate the intestine. It is a most valuable preparation, and will fill a distinct place in the treatment of the digestive troubles of children especially. The agents are Messrs. Roberts & Co., 76, New Bond Street, W.

Purgoids are sugar-coated compressed tablets, containing phenophthalein gr. 1, aloin, ipecac., and ex. bellad. liq. They give good results in chronic constipation. Prepared by Messrs. Evans Sons Lescher & Webb Ltd.

Retlanol (Ung.) is a coal-tar ointment prepared with lanolin, which has a very soothing effect in all cases of skin irritation. It has also been used with success for piles. Messrs. Evans, Gadd & Co., of Exeter.

Sea-water Plasma.—The article by Dr. Robert Simon in the last edition of the *Medical Annual* has created a demand for sea-water properly treated for injection, not only throughout Great Britain, but in all parts of the world. The supply for the experiments made by Dr. Percy Wilde, recorded in our last issue, was made by Messrs. R. Sumner & Co., of Liverpool, in combination with one of the large steamship companies, who arranged that the sea-water should be collected in the Atlantic by their own medical officers under the strictest antiseptic precautions. When delivered at Liverpool it is passed through a Pasteur filter, and delivered in aseptic bottles, either diluted or in its pure state. Dr. Percy Wilde considers that it keeps best when delivered *undiluted*, and only diluted with sterilized tap-water, as required for use. While boiling the sea-water to sterilize it will destroy its activity, he considers that it is best injected at something approaching the body temperature; this makes the injection quite painless and more easily absorbed. He also prefers a large serum syringe to the French method of gradual infiltration through a tube. It not only saves time, but a syringe is more easily rendered aseptic. He reports that in no single case have there been ill-results from the injection of sea-water.

Messrs. Oppenheimer, Son & Co., have also undertaken the supply of Sea-water Plasma, and supply it diluted ready for use, in aseptules of 30 cc., 50 cc., and 100 cc., with rubber tube and platino-iridium needle. We are glad that the supply of sea-water in this country is in reliable hands, and we believe it will greatly add to our therapeutic resources, while it may be employed without the slightest fear of unfavourable results.

Singlycol.—The treatment of glycosuria by physiological methods, has lately been investigated by Dr. Schäfer, Barmen, Germany, and he has succeeded in producing a combination of salts which produces a most astonishing effect in cases of diabetes. This combination is composed of the potassium and sodium salts present in the waters of Carlsbad and Neuenahr, together with the salts contained in normal blood-plasma. To these are added, on purely physiological principles, the mineral salts which are known to exercise a beneficial effect upon the cardiovascular apparatus. The action of singlycol in diabetes would seem to be as follows: By increasing the food of the nervous system, all the vital processes receive the stimulus which they have hitherto been asking for in vain, so that metabolism is properly and perfectly performed. The improvement in the quality of the red blood-corpuscles and the plasma, which quickly ensues after the ingestion of the salts, permits of complete oxidation of the sugar, which is then discharged as carbonic acid and water by way of the lungs and other natural channels. The rapid diminution of the sugar causes the disappearance of the muscular weakness and general apathy of which diabetics complain so bitterly. Messrs. Thos. Christy & Co., London, E.C., are the agents.

Sorbefacin.—A bland, non-irritating surgical dressing, containing menthol, thymol, and boracic acid, combined in a rich nutritive sorbefacient base of pure beef fat and vegetable oils. The principle of strengthening the patient by eutrophic action is not new, but a nutrient sorbefacient exceeding 4 per cent absorption in each twenty-four hours has hitherto been unknown. It is claimed by the manufacturers of sorbefacin, that under favourable circumstances fully 15 per cent of sorbefacin will absorb, and, in consequence, its antiseptic constituents are carried into the deeper tissues, thus reaching all the parts affected. Most satisfactory reports have come before us from practitioners who have employed it. It has been found especially useful in cases of burns or scalds, when it should be applied in a very thick layer, half-an-inch or over, to the affected part. Messrs. Thos. Christy & Co., Old Swan Lane, E.C., are the agents.

Spirosal, the monoglycolic ester of salicylic acid, is a colourless and odourless liquid, readily soluble in alcohol, ether, and chloroform, soluble (1–15) in olive oil. It is the most efficient method of exhibiting the local effects of salicylic

acid in cases of rheumatism as, unlike oil of wintergreen, it is free from smell, and it does not cause local irritation. A good formula is: ℞ Ess. menth. pip. ℥v; Spirosal ʒss; Aq. vini methyl. ad ʒij. A teaspoonful to be rubbed in thrice daily. The Bayer Co., Ltd., 19, St. Dunstan's Hill, E.C.

Stypticin is a most reliable uterine hæmostatic, having sedative and analgesic properties. It is prompt in action, and said to be absolutely harmless even when given in relatively large doses for a protracted period. In profuse menstruation, dysmenorrhœa, metritis, oophoritis, salpingitis, and uterine hæmorrhages generally, it will be found of great value. Stypticin may be administered by hypodermic injection, or internally by means of sugar-coated tablets. Mr. E. Merck, 16, Jewry Street, E.C.

Styracis Co. (Ung.) is an excellent analgesic and antiphlogistic ointment. It possesses a soothing affect upon inflamed surfaces, and is an excellent remedy for scabies. It contains storax, resorcin, menthol, etc. It is prepared by Messrs. R. Sumner & Co., of Liverpool.

Subitol is a compound of ammonium and sulphonic acids. It is completely soluble in water, and possesses therapeutic properties similar to ichthyol. It can be used both externally and internally in cases of acne, hæmorrhoids, etc. Messrs. Chas. Zimmermann & Co., 9 & 10, St. Mary-at-Hill, E.C.

Substitol is a dried fibrin of fresh blood containing, in as concentrated a form as possible, all the natural elements of nutrition for the repair of wounds. It is indicated in the treatment of badly granulating wounds and burns, skin grafts, etc., but is contraindicated in the presence of suppurative processes. It is prepared by Mr. E. Merck, 16, Jewry Street, E.C.

Thaolaxine.—A preparation of agar-agar, combined with "six per cent of extracts of various rhamnaceæ," has been put up in the form of scales, cachets, compressed tablets, and granules. It has been used in France in the treatment of chronic constipation, its effect being to add bulk and moisture to the fæces, without any direct purgative effect. It may have to be taken for several days, and in increasing doses, before any effect is observed. It is, therefore, only suitable in chronic cases, when it is desired to overcome the "pill habit." The excellent way in which it has been prepared gives every opportunity of carrying out the treatment in suitable cases, as agar-agar in its crude form is rather difficult to prescribe. The agents in Great Britain are Messrs. Roberts & Co., 76, New Bond Street, W.

Thephorin.—A double salt of sodium theobromine and sodium formate. It corresponds to diuretin, the salicylic radicle being replaced by a formate. It is easily soluble in warm water, and is used as a diuretic in cases of renal and cardiac dropsy in doses of 5 to 15 gr. thrice daily. The preparation is supplied by The Hoffmann-La Roche Chemical Works Ltd.

Thigenol is a dark-brown syrupy fluid, without much smell, from the same firm. It may be described as a sulpho-oleate containing 2·8 per cent of fixed sulphur. It is a useful method of employing sulphur externally in those skin diseases in which it is indicated. It is also useful as an antipruritic.

Thiocol.—A report on the literature of this valuable product has been prepared by M. Lubouski,.and can be obtained from The Hoffmann-La Roche Chemical Works Ltd. Containing 52 per cent of guaiacol, its therapeutic properties are similar, but its absence of odour and irritant effects renders it well borne even in large doses. In addition to its value in tuberculosis, it has been used with success in cases of pertussis, not so much to check the spasm as to shorten the duration of the attack. It has also a special value as an intestinal antiseptic.

Throat Pastilles.—Messrs. Allen & Hanburys have added to their list of throat pastilles some very useful formulæ. Thus: ℞ Formaldehyde ℥j; Menthol gr. $\frac{1}{10}$: is an excellent antiseptic and soothing remedy in the case of hoarseness and sore throat. ℞ Formaldehyde ℥j; Ol. cinnamon ℥$\frac{1}{2}$:

this has proved very useful in the catarrh of influenza, and inflammatory conditions of the throat. Phenolphthalein gr. j, as a laxative, is now put up in the form of these lozenges, which have the advantage of being slowly dissolved, so that the ingredients are retained in the mouth and throat for a long time, and are largely absorbed through the mucous membrane.

Thymo Antiseptic Co. (Liq.) (Gadd).—An excellent non-irritating antiseptic wash for the nose or mouth, suitable for cases of catarrh, or congestion of the throat and air-passages. Messrs. Evans, Gadd & Co., Bristol and Exeter.

Thymotussin.—A palatable preparation prepared from fresh green thyme (*Thymus vulgaris*) combined with honey, aromatics, and chloroform. It is widely used on the Continent, and various reports state that it is valuable in whooping-cough ; it is also largely prescribed in laryngitis, bronchial catarrh, emphysema, etc. Children take it readily owing to its palatability. A similar formula, but made with an equivalent proportion of the volatile oil or its phenol, thymol, will not yield the same results. Prepared by Messrs. Oppenheimer, Son & Co., Queen Victoria Street, E.C.

Thyresol is a new sandalwood-oil preparation, which has the advantage of not repeating, and is altogether better borne by the patient. It is best taken in the form of capsules (gr. v.) thrice daily. While it is a methyl-ether of santalol, the santalol is not split off in the system ; this explains its freedom from unpleasant reminders of the dose. The Bayer Co. Ltd.

Thyroid Gland.—Messrs. Burroughs Wellcome & Co. claim that their preparations of thyroid gland are standardized by chemical means controlled by physiological test, so as to ensure that the desiccated gland substance, of which each product represents a definite amount, contains not less than 0·2 per cent of iodine in organic combination.

Tonagen.—Messrs. Ferris & Co., of Bristol, have prepared under this name a tonic nutrient nerve food, which contains casein and other nutritive constituents of milk in combination with glycerophosphoric acid. It is readily assimilated by even the most delicate children, and has proved an excellent tonic in all cases where the nutrition of the nervous system is defective. Messrs. Ferris & Co. also supply it combined with pure cocoa and compressed into tablets. These may be either taken as they are, or used to prepare a cup of cocoa. We believe this will prove a valuable remedy both for children and adults, being both portable and palatable.

Triphosph. Co. (Tabellæ).—This is a combination of Parrish's, Fellows', and Easton's syrups, one tablet representing a drachm of the combined syrups. It is largely prescribed by physicians, who have found it an efficient tonic. Messrs. R. Sumner & Co., of Liverpool, are the manufacturers.

Tropacocaine.—Of all the substitutes for cocaine, tropacocaine most nearly resembles the latter in chemical, physiological and pharmacological properties, whilst it is by far the least toxic of this group of substances. Tropacocaine hydrochloride is freely soluble in water, and its solutions may be sterilized without fear of decomposition. Experimental evidence shows that tropacocaine is the most suitable for spinal anæsthesia. It is prepared by Mr. E. Merck, 16, Jewry Street, E.C.

Vaccines.—We have received an enormous amount of literature respecting tuberculin and vaccines, which are now supplied by all the leading manufacturers. It would be difficult for us to select any cultures for particular notice. Most of the leading firms now have bacteriological departments, under skilled supervision, and we feel sure that every care is taken to supply reliable cultures.

Vaginal Suppositories.—*Chloretone Compound Vaginal Suppositories* contain chloretone, acetanilide, zinc borate, boric acid, golden seal (hydrastis), and cuthymol. They have long been supplied with a gelatin basis, but as that

ingredient becomes less soluble after a time, the suppositories are now prepared with a cacao-butter basis. They are wedge-shaped, and very easily introduced into the cervix uteri. Their combined antiseptic, astringent, and sedative properties are of great benefit in catarrhal inflammations of the vagina. *Thiodine Compound Vaginal Suppositories* contain ichthyol, iodine, boric acid, hydrastine, and carbolic acid. This combination possesses anodyne, derivative, antiseptic, and stimulant properties which are of special value in the treatment of purulent inflammation of the female genital tract. Both are supplied by Messrs. Parke, Davis & Co., Beak Street, W.

Valisan is a combination of bromine with isovalerian-acid-borneol-ester, i.e., the active principle of valerian root, prepared by Schering. It has yielded excellent results in the treatment of many neuroses on account of its great sedative properties, its harmlessness, and improved taste. It can be obtained from Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Veronal Co. (Mist.) is a very valuable addition to hypnotic remedies, because veronal is supplied in a liquid form, and a teaspoonful in water is often a sufficient dose. The uncertain action of most hypnotics of this class is due to their slow solubility, and we believe that the preparation will be much appreciated by our readers. Messrs. C. J. Hewlett & Son Ltd.

Vitaregis.—Under this name an " Aperient Water " has been sent to us by the Vitaregis Water Company, 39, Aldermanbury, E.C. No particulars of constituents, or source, are given. We have no doubt that it is capable of producing the effects claimed for it ; but the medical profession like to have a little more information about the remedy they are prescribing than has been afforded us.

Wassermann Reaction.—The various ingredients for this test can now be obtained from Messrs. A. & M. Zimmermann, 3, Lloyd's Avenue, E.C.

Zinci Sedativa (Lotio).—This lotion (which contains 12 gr. of oxide of zinc in each fluid ounce) evaporates very quickly and relieves irritation, and at the same time the healing properties of the zinc oxide are brought into play. It is quite a specific application in eczema, and is useful in all irritable conditions of the skin. Is also supplied with 5 per cent ichthyol added. Messrs. Ferris & Co., Bristol, are the manufacturers.

BOOKS OF THE YEAR.

A List of the Principal Medical Works and New Editions Published during 1910.

*** *For the convenience of our readers any of the works in this list can be obtained from Messrs. John Wright & Sons, Ltd., "Medical Annual" Offices, Bristol.*

AMBULANCE AND NURSING.

First Aid to the Injured. By a Medical Officer. Cr. 8vo, limp. *Warne.* *Net* 6*d.*

"First Aid" to the Injured and Sick. By F. J. Warwick and A. C. Tunstall. An Advanced Ambulance Handbook. 6th ed., revised and enlarged. 257 Illus. 12mo, pp. 240. *J. Wright & Sons, Ltd. Sewed, Net* 1*s.*

First Aid to the Sick; or, Diseases, their Description and Treatment. By D. Hastings Young. Cr. 8vo, pp. 288. *Routledge* - *Net* 3*s.* 6*d.*

Doctor and Nurse's Guide. Edited by George Black. Cr. 8vo, pp. 224. *Ward, Lock* - - - - - - - 1*s.*

Handbook for Nurses. By Sydney Welham. Cr. 8vo, pp. 240. *Mills.* *Net* 3*s.* 6*d.*

Home Nursing. By Bernard Myers. 2nd ed. Cr. 8vo, pp. 156. *Baillière.* *Cloth,* 2*s.* 6*d.* *Sewed, Net* 1*s.* 6*d.*

How to Cook for the Sick and Convalescent. By H. V. Sachse. 3rd ed. 12mo, pp. 335. *Lippincott* - - - - *Net* 6*s.*

Nurses' Guide to Prescription Reading. By J. G. H. 18mo, pp. 150. *Livingstone* - - - - - - *Net* 1*s.* 6*d.*

Practical Nursing. By Isla Stewart and Herbert E. Cuff. Cr. 8vo. pp. 446. *Blackwood* - - - - - *Net* 5*s.*

Practical Nursing for Male Nurses in the R.A.M.C. and other Forces. By E. M. & A. R. Hassard. *Oxford Medical Publications.* Cr. 8vo, pp. 354. *H. Frowde* - - - - - - *Net* 3*s.* 6*d.*

Text-Book Nursing. By M. F. Donahoe. Cr. 8vo. *Appleton. Net* 7*s.* 6*d.*

Two Lectures to Nurses. By O. Browne. 3rd. ed. 12mo. *Allen.* *Net* 1*s.*

ANATOMY AND PHYSIOLOGY.

A Compend of Histology. By Henry Erdmann Radasch. 2nd ed, revised and enlarged. Cr. 8vo, pp. 368. 107 Illus. *Rebman* - *Net* 5*s.*

Addenda and Errata to "Essentials of Human Physiology." By D. Noel Paton. 8vo. *Green* - - - - *Sewed, Net* 1*s.*

Applied Anatomy. By G. G. Davis. Roy. 8vo. 575 Illus. *Lippincotts* *Net* 24*s.*

Cunningham's Manual of Practical Anatomy. By D. J. Cunningham. Vols. I. and II. 4th ed, revised by Arthur Robinson. Cr. 8vo, pp. 656, 632. *H. Frowde* - - - - - - *Each* 10*s.* 6*d. Net.*

Essentials of Histology: Descriptive and Practical. For the Use of Students. By E. A. Schäfer. 8th ed. Demy 8vo, pp. 584. *Longmans* - - - - - - - - *Net* 10*s.* 6*d.*

History of the Human Body. By H. H. Wilder. 8vo. *Bell.* *Net* 14*s.*

Human Anatomy for Art Students. By Sir A. D. Kripp and R. Thompson. Cr. 8vo, pp. 286 and Plates. *Seeley* - *Net* 7*s.* 6*d.*

LECTURES ON BIOLOGY. By Dr. Thesing. Translated from the 2nd ed. by W. R. Boelter. Coloured and other Illus. Medium 8vo, pp. 342. *Bale* 10s. 6d.

LESSONS IN HYGIENIC PHYSIOLOGY. By W. M. Coleman. Cr. 8vo. *Macmillan* - - - - - - - - 3s. 6d.

LIVING ANATOMY AND PATHOLOGY. By T. M. Rotch. 4to. *Lippincott.* *Net* 25s.

MANUAL OF HUMAN EMBRYOLOGY. By C. R. Bardeen and others. Edited by F. Keibel and F. P. Mall. Vol. I. Illust. pp. 566, 423 Illust. Roy. 8vo. *Lippincott* - - - - - - - *Net* 30s.

MANUAL OF PHYSIOLOGY. With Practical Exercises. By G. N. Stewart. 6th ed. Demy 8vo, pp. 1084. *Baillière* - - - *Net* 18s.

MANUAL OF SURGICAL ANATOMY. By Charles R. Whittaker. Cr. 8vo, pp. 258. Illus. *Livingstone* - - - - *Net* 5s.

NORMAL HISTOLOGY. By G. A. Piersol. 8th ed. 8vo. *Lippincott.* *Net* 15s.

NOTES ON PHYSIOLOGY. By Henry Ashby. 8th ed. Cr. 8vo, pp. 368. *Longmans* - - - - - - - 5s.

NOTES ON PRACTICAL PHYSIOLOGY. By John Malcolm. For the Use of Students of Medicine. Illus. Cr. 8vo, pp. 190. *Bryce* - *Net* 7s. 6d.

POST-MORTEM MANUAL. A Handbook of Morbid Anatomy and Post-Mortem Technique. By Charles R. Box. Cr. 8vo, pp. 348. *Churchill.* *Net* 6s.

PRACTICAL PHYSIOLOGY. By Various Writers. 3rd ed. Edited by M. S. Pembrey. Demy 8vo, pp. 498. *Arnold* - - - *Net* 14s.

PHYSIOLOGY, THE SERVANT OF MEDICINE. By Augustus D. Waller. Hitchcock Lectures, 1909. Demy 8vo, pp. 152. *Hodder & Stoughton.* 5s.

PHYSIOLOGY OF THE SPECIAL SENSES. By M. Greenwood. 8vo, pp. 248. *Arnold* - - - - - - - - *Net* 8s. 6d.

PRELIMINARY PHYSIOLOGY. By William Narramore. Cr. 8vo, pp. 240. *Methuen* - - - - - - - - 3s. 6d.

PSYCHOTHERAPEUTICS. A Symposium. By Various Authors. Cr. 8vo, pp. 206. *Unwin.* - - - - - - *Net* 4s. 6d.

THE THYROID AND PARATHYROID GLANDS THROUGHOUT VERTEBRATES, WITH OBSERVATIONS ON SOME OTHER CLOSELY RELATED STRUCTURES. By F. D. Thompson. 4to. *Dulau* - - *Sewed, Net* 4s. 6d.

BACTERIOLOGY.

AGRICULTURAL BACTERIOLOGY, THEORETICAL AND PRACTICAL. By John Percival. Cr. 8vo, pp. 418. *Duckworth* - - - - *Net* 7s. 6d.

BACTERIOLOGY FOR NURSES. By I. McIsaac. Cr. 8vo. *Macmillan. Net* 5s.

BACTERIOLOGISTS' AID TO MEMORY. A handy reference sheet for the Laboratory. By J. W. S, Seccombe. *Bale.* 3s. 6d.; *mounted on linen*, 4s. 6d.; *ditto with rollers*, 5s. 6d.

MANUAL OF BACTERIOLOGY. By Robert Muir and James Ritchie. 5th ed. Cr. 8vo, pp. 712. *H. Frowde* - - - - *Net* 10s. 6d.

STORY OF THE BACTERIA. By T. M. Prudden. 2nd ed. Cr. 8vo. *Putnam.* *Net* 3s. 6d.

TEXT-BOOK OF BACTERIOLOGY. By P. H. Hiss and H. Zinsser. 8vo, leather. *Appleton.* - - - - - *Net* 15s.

TEXT-BOOK OF GENERAL BACTERIOLOGY. By W. D. Frost and E. F. McCampbell. Cr. 8vo. *Macmillan* - - - *Net* 7s.

CANCER.

CANCER AND ITS REMEDY. By R. Bell. Cr. 8vo, pp. 137. *Medical Times.* 3s. 6d.

INDUCED CELL-REPRODUCTION AND CANCER. By Hugh Campbell Ross. Roy. 8vo, pp. 320. *J. Murray* - - - - *Net* 12s

THE NATURE OF CANCER. By J. Clay. Cr. 8vo. *Sonnenschein. Net* 3s. 6d

CHEMISTRY AND PHYSICS.

CALCULATIONS OF GENERAL CHEMISTRY. By W. J. Hale. 2nd ed. Cr. 8vo. *Bell* - - - - - - - - 4*s.* 6*d.*

CHEMISTRY FOR MATRICULATION. By G. H. Bailey. *University Tutorial Series.* Cr. 8vo. pp. 552. *Clive* - - - *Net* 5*s.* 6*d.*

FIRST YEAR'S COURSE OF INORGANIC CHEMISTRY. By G. F. Hood. Cr. 8vo, pp. 112. *Rivingtons.* - - - - - 1*s.* 6*d.*

GENERAL INORGANIC CHEMISTRY. By C. Baskerville. Cr. 8vo. *Heath.* 3*s.* 6*d.*

LABORATORY NOTES ON ORGANIC CHEMISTRY, FOR MEDICAL STUDENTS. By Paul Haas. Cr. 8vo, pp. 136. *Macmillan* - - *Net* 2*s.* 6*d.*

MANUAL OF CHEMISTRY, THEORETICAL AND PRACTICAL, INORGANIC AND ORGANIC. By Arthur P. Luff and H. C. H. Candy. New and enlarged ed. 12mo. 43 Illus. pp. 638. *Cassell* - - - *Net* 7*s.* 6*d.*

MANUAL OF PRACTICAL INORGANIC CHEMISTRY. By A. M. Kellas. *Oxford Medical Publications.* Demy 8vo, pp. 356. *H. Frowde.* - *Net* 5*s.*

ORGANIC CHEMISTRY OF NITROGEN. By Nevil Vincent Sidgwick. Roy. 8vo, pp. 428. *H. Frowde* - - - - - *Net* 14*s.*

OUTLINES OF ORGANIC CHEMISTRY. By F. J. Moore. Cr. 8vo. *Chapman and Hall* - - - - - - - *Net* 6*s.* 6*d.*

PHYSICAL CHEMISTRY: ITS BEARING ON BIOLOGY AND MEDICINE. By James C. Phillips. Cr. 8vo, pp. 320. *Arnold* - - *Net* 7*s.* 6*d*

PRACTICAL PHYSIOLOGICAL CHEMISTRY. By P. B. Hawk. 3rd ed. 8vo. *Churchill* - - - - - - - - *Net* 16*s.*

QUALITATIVE CHEMICAL ANALYSIS. By A. A. Noyes. Cr. 8vo. *Macmillian. Advanced to net* 6*s.* 6*d.*

QUALITATIVE CHEMICAL ANALYSIS, ORGANIC AND INORGANIC. By F. Mollwo Perkin. 3rd ed. 8vo, pp. 350. *Longmans* - 4*s.* 6*d.*

RADIOCHEMISTRY. By A. T. Cameron. Cr. 8vo, pp. 184. *Dent. Net* 2*s.* 6*d.*

RELATIONS BETWEEN CHEMICAL CONSTITUTION AND SOME PHYSICAL PROPERTIES. By Samuel Smiles. Cr. 8vo, pp. 598. *Longmans* 14*s.*

TEXT-BOOK OF PHYSICS. By A. W. Duff. 2nd ed. 525 Illus. *Churchill. Net* 10*s.* 6*d.*

CHILDREN'S DISEASES AND INFANCY.

ACUTE INTESTINAL TOXÆMIA IN INFANTS. By R. Vincent. Pp. 87. *Baillière* - - - - - - - *Net* 3*s.* 6*d.*

CARE OF CHILDREN. By B. Myers. 2nd ed. Cr. 8vo. *H. Kimpton. Net* 2*s.* 6*d.*; *Sewed, Net* 1*s.* 6*d.*

CARE OF INFANTS AND YOUNG CHILDREN IN HEALTH. By Dr. Mildred M. Burgess. Cr. 8vo, pp. 80. *H. K. Lewis* - *Sewed, Net* 1*s.*

CHILD, THE: A Medical Guide to its Care and Management. By Albert Westland. Cr. 8vo, pp. 200. *C. Griffin* - - - *Net* 2*s.* 6*d.*

CHILDHOOD. By T. N. Kelynack. *National Health Manuals.* Cr. 8vo, pp. 160. *Kelly* - - - - *Net* 1*s* 6*d. limp, Net* 1*s.*

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FIRST AID TO THE CHILD. By D. Hastings Young. A Guide to the Feeding and Treatment of Infants in Health and Disease. Cr. 8vo, pp. 328. *Routledge* - - - - - - - 3*s.* 6*d.*

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Armagh. — *District Asylum.* Res. Med. Supt., Dr. Geo. R. Lawless. Access—Armagh, ½ mile.

The Retreat.—Res. Med. Supt., Dr. J. Gower Allen, J.P. Access—Richhill station, 1½ miles, or Armagh station, 3 miles.

Ayr.—*District Asylum.*—Med. Supt., Douglas McRae, M.D. Access—Ayr station, 2 miles.

Ballinasloe (Co. Galway).—*District Lunatic Asylum.* Res. Med. Supt., J. St. L. Kirwan, B.A., M.B. Access—Ballinasloe.

Banff. — *District Asylum,* Ladysbridge. Res. Supt., J. Chisholm. Vis. Phys., Wm. Fergusson, M.D. Access—Ladysbridge station.

Baschurch (Shropshire).—*Boreatton Park,* 10 miles from Shrewsbury. Res. Med. Supt., Dr. E. H. O. Sankey. Access—Baschurch station, 2½ miles. *See also p.* 942

Bath.—*Bailbrook House.* Res. Med. Supt., Norman Lavers, M.D. Access—Bath, 10 minutes' drive.

Bedford.—*Bishopstone House* (for ladies only). Prop., Mrs. Peele. Med. Off., Dr. H. Skelding. Access—Bedford.

Springfield House Private Asylum, 1 hour from London. Better class patients only received. Separate bedrooms. Terms from 3 guineas. Res. Med. Supt., D. Bower, M.D. Access—Bedford, 1½ mile, M.R., and L. & N.W.R. Teleph. No. 17. *See also p.* 944

Belfast. — *Belfast District Lunatic Asylum.* Res. Med. Supt., Wm. Graham, M.D. Access—Belfast.

Beverley.—*East Riding of Yorkshire County Asylum.* Res. Med. Supt., Dr. M. A. Archdale. Access—Beverley station, 2 miles.

Birmingham.—*Birmingham City Asylum,* Rubery Hill, near Birmingham. Res. Med. Supt., A. C. Suffern, M.D. Access—Rubery station.

Birmingham City Asylum, Winson Green. Res. Med. Supt., E. B. Whitcombe. Access—Winson Green, ½ mile; Soho, ¼ mile.

Bodmin.—*Cornwall County Asylum.* Res. Med. Supt., Dr. Henry A. Layton.

Box (Wilts). — *Kingsdown House,* 5 miles from Bath. Res. Med. Supt., Dr. H. C. MacBryan. Access—Box. *See also p.* 940

Brentwood. — *Essex and Colchester Asylum.* Res. Med. Supt., Dr. John Turner. Access—Brentwood station, ½ mile.

Bridgend.—*Glamorgan County Asylum.* Res. Med. Supt., D. Finlay, M.D. Access—Bridgend, 1½ miles.

Bristol. — *Brislington House.* Proprietress, Mrs. Bonville Fox. Res. Physician, Dr. J. M. Rutherford. Asst. Med. Officer, Dr. G. H. Rains. Access—Bristol 3 miles.

City and County Asylum, Fishponds. Res. Med. Supt., J. Vincent Blachford, M.D. Clerk, Arthur Orme. Access—Fishponds station, 1 mile.

Northwoods House, Winterbourne 7 miles from Bristol. Res. Med. Props., Reginald Eager, M.D., and J. D. Thomas, B.A., M.B., B.C. Access—Cab from Bristol, or from Fishponds, Winterbourne, or Patchway stations. *See also p.* 949

Bromsgrove (Worcs.). — *Worcestershire Asylum, "Barnsley Hall."* Res. Med. Supt., Dr. P. T. Hughes. Access—Bromsgrove, M.R., 2½mls.

Burgess Hill (Sussex).—*St. George's Retreat.* Res. Med. Supt. Dr. M. P. Scanlon. Access — B .rgess Hill station. *See also p.* 947

Buxton.—*Wye House.* Res. Med. Supt., Graeme Dickson, L.R.C.P. & S., and Res. Asst. Med. Officers, Access—Buxton, L. & N.W.R. and M.R., 10 minutes. *See also p.* 939

Caerleon (Mon.).—*Newport Borough Asylum.* Res. Med. Supt., W. F. Nelis, M.D. Access—Caerleon, ½ ml.

Cambridge.—*County Asylum.* Res. Med. Supt., Dr. A. D. Thompson. Access—Cambridge stat., 3½ miles.

Canterbury.—*Stone House,* St. Martin's. Res. Med. Supt., Dr. E. F. Sall. Access—Canterbury East.

Cardiff.—*Cardiff City Mental Hospital.* Res. Med. Supt., E. Goodall, M.D. Access—Llandaff, T.V.R., ¼ mile.

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Carlisle.—*Cumberland & Westmorland Counties Asylum.* Res. Med. Supt., W. F. Farquharson, M.D. Access—Carlisle, 3 miles.

Carlow.—*District Asylum.* Res. Med. Supt., Dr. T. A. Greene. Access—Carlow, ¼ mile.

Carmarthen.—*Joint Counties Asylum.* Res. Med. Supt., J. Richards, F.R.C.S.E. Access—Carmarthen, 2 miles.

Castlebar (Co. Mayo).—*District Asylum.* Res. Med. Supt., F. C. Ellison, M.D. Access—Castlebar 1 mile.

Chartham (near Canterbury).—*Kent County Asylum.* Res. Med. Supt., G. C. Fitzgerald, M.D. Access—Chartham station, 1 mile.

Cheadle. — *Cheadle Royal Mental Hospital.* Res. Med. Supt., W. Scowcroft, L.R.C.P., M.R.C.S. Access—Cheadle, 2 miles.

Chester.—*Cheshire County Asylum.* Res. Med. Supt., G. Hamilton Grills, M.D. Station, 1½ miles.

Chichester. — *West Sussex County Asylum* (*Graylingwell Hospital*). Res. Med. Supt., Dr. H. A. Kidd. Access—Chichester stat., 1½ miles.

Church Stretton.—*Stretton House,* Shropshire (for gentlemen). Res. Med. Prop., Horatio Barnett, M.B. Access—Church Stretton station, ½ mile. *See also p.* 940

The Grove House, All Stretton, Shropshire (for ladies). Res. Prop. and Med. Supt., Dr. McClintock.

Clonmel. — *District Asylum.* Res. Med. Supt., Dr. Bagenal C. Harvey. Access—Clonmel, 1 mile.

Colchester.—*Royal Eastern Counties Imbecile Asylum.* Res. Supt. and Sec., John J. C. Turner. Access—Colchester.

Cork.—*District Asylum.* Res. Med. Supt., Dr. J. J. FitzGerald. Access—Cork, 2 miles.

Cupar (Fifeshire).—*Fife and Kinross District Asylum.* Res. Med. Supt., A. R. Turnbull, M.B. Access—Springfield station.

Darlington (Durham). — *Dinsdale Park.* Res. Med. Supt., H. W. Kershaw, M.R.C.S. Access—Darlington, 5 miles; Dinsdale, 1 mile.

Middleton Hall, Middleton St. George, Co. Durham. Res. Licen. and Med. Supt., L. Harris-Liston, M.D. Access — Dinsdale station, 1 mile. *See also p.* 951

Dartford.—*City of London Mental Hospital,* near Dartford. Res. Med. Supt., Dr. R. H. Steen. Access—S.E.R. Dartford, 1½ miles. *See also p.* 946

Denbigh (N. Wales).—*North Wales Counties Asylum.* Med. Supt., Dr. Llewelyn F. Cox. Access—Denbigh, 1 mile.

Derby.—*Borough Asylum, Rowditch.* Res. Med. Supt., Dr. Macphail. Access—G.N.R. station, 1 mile; M.R. 2 miles. *See also p.* 953

County Asylum, Mickleover, Res. Med. Supt., R. Legge, M.D. Access—Derby, M.R. 5 miles; Mickleover, G.N.R. 2 miles.

Devizes.—*Wilts County Asylum.* Res. Med. Supt., J. I. Bowes, M.R.C.S. Access—Devizes, 1 mile.

Dorchester.—*The County Asylum, "Herrison."* Med. Supt., P. W. Macdonald, M.D. Access—Dorchester, 3 miles. *See also p.* 944

Downpatrick.—*District Asylum.* Res. Med. Supt., M. J. Nolan, L.R.C.P.I. & L.M. Access—Downpatrick, 1 ml.

Drumcondra (Co. Dublin).—*Hartfield House.* Med. Prop., Dr. F. E. Lynch. Vis. Phys., Dr. Matthew Burke Savage. Access—Dublin, 2 miles.

Dublin.—*Bloomfield,* Morehampton Road. Med. Officer, H. T. Bewley, M.D. Access—Dublin, 1 mile.

Farnham House and *Maryville,* Finglas (for 56 patients, both sexes). Prop. and Res. Med. Supt., W. R. Dawson, M.D. Access—Cab from Dublin, 2 miles.

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See also p. 952

Highfield (for ladies), Drumcondra. *Hampstead* (for gentlemen). Glasnevin. Res. Med. Supts., Hy. M. Eustace, B.A., M.D., and Dr. Wm. N. Eustace. Access—By rail, Dublin. *See also p.* 953

House of St. John of God, Stillorgan. Res. Phys., Dr. P. O'Connell. Access—Stillorgan station, ½ mile; Dublin, 5 miles.

Richmond District Asylum. Res. Med. Supt., Dr. J. O'Conor Donelan.

St. Patrick's Hospital, James Street. Res. Med. Supt., Dr. R. R. Leeper. Branch Asylum at Lucan. Asst. Med. Offs., Dr. H. R. C. Rutherford and Dr. Ferguson Shepherd. *See also p.* 952

St. Vincent's Asylum, Fairview. Vis. Med. Supts., Sir Francis R. Cruise, D.L., M.D., and John Murphy, F.R.C.P.I. Apply to the Superioress.

Stewart Institution, Palmerston, Chapelizod. Res. Med. Supt., F. E. Rainsford, M.D. Access—Kingsbridge station, 2½ miles.

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Woodbine Lodge, Rathfarnham, 6 miles (ladies). Prop., Mrs. Bishop. Med. Supt., Dr. A. Croly. Access—Rathfarnham tram, 2 miles.

Dudley (Stafford).—*Ashwood House,* Kingswinford. Props. Drs. Peacock and Pietersen. Res. Med. Supt., Dr. Pietersen. Access—Stourbridge Junc. 3½ miles, Dudley station, 4 miles; Wolverhampton, 7 miles. *See also p.* 947

Dumfries.—*Crichton Royal Institution.* Res. Med. Supt., Dr. C. C. Easterbrook. Access—Dumfries, 1 mile.

Dundee.—*Royal Asylum* and *District Asylum* Westgreen. Res. Med. Supt., W. Tuach-Mackenzie, M.D. Access—Dundee, 3 miles; Liff, 1½ miles.

Durham.—*County Asylum,* Winterton. Res. Med. Supt., Dr. W. St. J. Skeen, M.B. Access—Sedgefield station, 3 miles, by 'bus.

Earlswood.—*Training Home for the Feeble-minded and Imbecile.* Sec., H. Howard, 36 King William St., E.C. Res. Med. Supt., Dr. Charles Caldecott. Access—Earlswood station or Red Hill Junc., 1½ miles.

Edinburgh.—*Midlothian and Peebles District Asylum* (Patients, 350). Res. Med. Supt., R. B. Mitchell, M.D. Access—Rosslynlee station, 1 mile.

Royal Edinburgh Asylum, Morningside. Res. Phys. Supt., Dr. G. M. Robertson. Access—Edinburgh, 1½ miles.

New Saughton Hall, Polton. Med. Supt. J. B. Tuke, M.D. Access—Princes Street station, 20 minutes.

Elgin.—*District Asylum.* Res. Supt., Alexander Hendry. Vis. Med. Off., Dr. D. G. Campbell. Access—Elgin, 1¼ mile.

Ennis.—*District Asylum.* Res. Med. Supt., Dr. F. O'Mara. Access—Ennis station, 2 miles.

Enniscorthy (Co. Wexford).—*District Lunatic Asylum.* Res. Med. Supt., Thos. Drapes, M.B. Access—Enniscorthy, 1 mile.

Epsom (Surrey).—*Abele Grove* (for ladies). Prop., Mrs. Atkins. Med. Supt., E. N. Reichardt, M.D.

The Silver Birches, Church Street (for ladies). Res. Licensee, Miss Daniel. Co-Licensee, Dr. E. C. Daniel. Access—L. & S.W.R. and L.B. & S.C.R., 5 minutes.

See also p. 945

Exeter.—*City Asylum,* Heavitree. Res. Med. Supt., R. L. Rutherford, M.D. Access—Exeter, 3 miles.

Court Hall, Kenton, near Exeter. Res. Licensees, Miss Mules, M.D., B.S., and Miss A. S. Mules. Access—Starcross, 1 mile.

Devon County Asylum, Exminster. Res. Med. Supt., Dr. Arthur N. Davis. Access — Exminster, 1¼ miles; Exeter, 4 miles.

Wonford House (Hospital for the Insane). Res. Med. Supt., W. B. Morton, M.D., Lond. Access—Exeter station (Queen St.) 1½ miles; (St. David's) 2 miles.

Fairford (Gloucestershire).—*Fairford Retreat.* Res. Med. Prop., Dr. A. C. King-Turner. Access—Fairford.

Glasgow.—*District Asylum,* Woodilee. Res. Med. Supt., H. Carre, L.R.C.P. & S. Access—Lenzie station, 1 mile; Glasgow, 8 miles.

Glasgow District Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Access—Garnkirk station, 1 mile.

Govan District Asylum, Hawkhead. Res. Med. Supt., Dr. W. R. Watson. Access—Crookston statn.

Kirklands Asylum, Bothwell. Res. Med. Supt., James H. Skeen, M.B. Access—Bothwell and Fallside stations, ½ mile; Glasgow, 9 miles.

Lanark District Asylum, Hartwood, Shotts. Med. Supt., Dr. N. T. Kerr. Access — Hartwood, 5 minutes.

Royal Asylum, Gartnavel. Res. Phys. Supt., Landel R. Oswald, M.B.

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Gloucester.—*Barnwood House.* Res. Med. Supt., J. G. Soutar, M.B., C.M. Access—Gloucester, 2 miles.

See also p. 948

Gloucester County Asylums, Wotton and Barnwood, Gloucester. Res. Med. Supt., Dr. R. B. Smyth. Access—Gloucester station, 1 mile

Great Yarmouth.—*Royal Naval Hospital.* Fleet Surgeon in charge. Access—Great Yarmouth station, 1 mile. For Naval patients only, admitted by Admiralty order.

Guernsey.—*St. Peter Port Asylum.* Med. Off., E. K. Corbin, M.R.C.S.

Haddington, N.B.—*District Asylum,* 17 miles from Edinburgh. Med. Supt., J. Bruce-Ronaldson, M.D. Access — Haddington station, 10 minutes.

See also p. 943

Hatton (near Warwick). — *County Asylum.* Res. Med. Supt., A. Miller, M.B. Access—Hatton station, 2 miles; Warwick, 3 miles.

Hayward's Heath.—*Brighton County Borough Asylum.* Res. Med. Supt., C. Planck, M.A., M.R.C.S. Access—Hayward's Heath, 1½ miles.

Hellingly.—*East Sussex County Asylum.* Res. Med. Supt., F. R. P. Taylor, M.D.

See also p. 944

Henley-in-Arden (Warwickshire).—*Glendossil* and *Hurst Houses* (for both sexes). Res. Prop., Dr. S. H. Agar. Access—Henley-in-Arden, G.W.R., ¾ mile.

Hereford.—*County and City Asylum.* Res. Med. Supt., C. S. Morrison, L.R.C.P. Ed. Access—Barrs Court, Hereford, 3 miles.

Hitchin (Herts), near.—*Three Counties Asylum.* Res. Med. Supt., L. O. Fuller, M.R.C.S., L.R.C.P. Access—Three Counties stat., 1 mile.

Hull.—*City Asylum.* Res. Med. Supt., J. Merson, M.D. Access—Willerby station, 1 mile.

Inverness.—*District Asylum.* Med. Supt., T. C. Mackenzie, M.D. Access—Inverness, 2½ miles.

Ipswich.—*Borough Mental Hospital.* Med. Supt., Dr. E. L. Rowe. Access—Ipswich, 2 miles.

Isle of Man.—*Lunatic Asylum*, Union Mills. Res. Med. Supt., W. Richardson, M.D. Access — Douglas, 3 miles.

Isle of Wight.—*The County Asylum*, Carisbrooke. Res. Med. Supt.-Harold Shaw, M.B. Access—Black, water, ¾ mile; Newport, 2½ miles.

Isleworth (Middlesex).—*Wyke House*. Res. Prop., Dr. F. Murchison. Access — Isleworth, Brentford, Osterley station, 1 mile.

Ivybridge.—*Plymouth Borough Asylum*. Res. Med. Supt., W. H. Bowes, M.D. Access—Bittaford, ¼ mile; Wrangaton G.W.R., 1½ miles; Ivybridge, 3 miles.

Jersey.—*Cranbourne Hall*, Grouville. Med. Supt., A. C. Stamberg, M.D. Access—Grouville, 2 mins. walk. *See also p.* 952

The Grove. Res. Med. Prop., F. N. Gaudin, M.R.C.S. 2½ miles from St. Heliers, 2 from St. Aubin's.

Jersey Asylum, St. Heliers. Res. Med. Supt., Julius Labey, M.R.C.S. Access—Gorey Village, 1 mile.

Kilkenny.—*District Asylum*. Res. Med. Supt., G. F. West, L.R.C.P. Access—Kilkenny station, ¼ mile.

Killarney.—*District Asylum*. Res. Med. Supt., E. W. Griffin, M.D. Asst. Med. Off., G. W. Downing, L.R.C.P. & S. Access—Killarney, ½ mile.

Kirkintilloch (near Glasgow).—*Westermains Private Asylum*. For ladies; quiet cases only received. Apply to Mr. Jas. Lawrie, Res. Proprietor. *See also p.* 950

Knowle (near Fareham).—*County Asylum*. Med. Supt., H. K. Abbott, M.D. Access—Knowle platform, ⅛ mile.

Lancaster.—*County Asylum*. Res. Med. Supt., D. M. Cassidy, M.D. Access—Lancaster, L. & N.W. and Midland stations, each 1¼ miles. *See also p.* 943

Lancashire, nr. Newton-le-Willows.—*Haydock Lodge*, Private Mental Hospital. Res. Med. Prop., Dr. C. T. Street. Access—Newton-le-Willows, 2 miles.

Leeds (Menston, near).—*West Riding Asylum*. Res. Med. Supt., S. Edgerley, M.D. Access—Guiseley, 1 mile.

Leek (Stafford).—*County Asylum*, Cheddleton. Med. Supt., W. F. Menzies, M.D. Access — Wall Grange station, 1 mile.

Leicester.—*Borough Asylum*, Humberstone. Res. Med. Supt., J. E. M. Finch, M.D. Access—Leicester.

Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Access—Narborough ¾ mile; Leicester, 7 miles.

Letterkenny.—*Donegal District Asylum*. Res. Med. Supt., E. E. Moore, M.D. Asst. Med. Off., J. C. Martin, L.R.C.S.I. Access—Letterkenny and Lough Swilley Rly., 1 mile.

Lichfield.—*County Lunatic Asylum*, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Access—Lichfield City, 3½ miles; Trent Valley, 4½ miles; Hammerwich, 1½ miles.

Limerick. — *District Asylum*. Res. Med. Supt., Dr. E. D. O'Neill. Access—Limerick station, ½ mile.

Lincoln. —*County Asylum*, Bracebridge. Res. Med. Supt., Dr. T. L. Johnston. Access—2½ miles from Lincoln G.N.R. station.

The Lawn. Res. Med. Supt., Arthur P. Russell, M.B. Access—Lincoln stat. 1 mile. *See also p.* 945

Liverpool.—*Shaftesbury House*, Formby, near Liverpool and Southport. Res. Med. Supt., Stanley A. Gill, B.A., M.D. Access—Formby station, ¼ mile distant. *See also p.* 941

Tue Brook Villa, Liverpool, E. Res. Med. Supts., Drs. Tisdall & Ingall. Access—Tue Brook station or Green Lane car. *See also p.* 952

London.—*Bethlem Royal Hospital*, St. George's Road, London, S.E. Res. Med. Supt., Theo. B. Hyslop, M.D., M.R.C.P.E. *See also p.* 946

Bethnall House, Cambridge Road, N.E. Res. Med. Supt., J. K. Will, M.D. Access—Cambridge Heath station. *See also p.* 946

Brooke House, Clapton, N.E. Props., Mr. H. T. Monro and Dr. J. O. Adams. Res. Med. Supt., Dr. Gerald Johnston. Access—Clapton, G.E.R.

Camberwell House, Peckham Road, S.E. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Offs., G. H. Keene, B.A., M.D., B.Ch., and H. J. Norman, M.B., B.Ch., D.P.H. Telegrams, "Psycholia, London." Telephone, Hop. 1037 *See also p.* 948

Chiswick House, Chiswick. Res. Lics., Dr. T. S. Tuke and C. M. Tuke, M.R.C.S. Access—Chiswick station, ½ mile; Turnham Green station, 1 mile. *See also p.* 951

Clarence Lodge, Clapham Park, S.W. Prop., Mrs. F. Thwaites, B.A. Med. Off., Dr. Percy Smith. Access: Clapham Rd., and Clapham Common (Electric), 15 minutes. Tel. No. 494 Brixton.

See also p. 945

Featherstone Hall, Southall. Res. Med. Lic., W. H. Bailey, M.D. Access—Southall station, 5 minutes.

Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., T. Duncan Greenlees, M.D., F.R.S. Edin. Access—Tulse Hill, 5 minutes.

Flower House, Catford, S.E. Res. Med. Supt., Dr. C. C. Bullmore, Access—C. & D. R. Beckenham Hill, 5 minutes.

Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Access—Sunbury station, 1¼ mile.

Hayes Park, Hayes, Middlesex, near Uxbridge. Res. Med. Off., Dr. J. W. Higginson. Access—Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon. Med. Lic., F. W. Edridge-Green, M.D., F.R.C.S. Access—By M.R., Hendon station, ½ mile, or 'bus from Tube at Golder's Green.

London County Asylum, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., Dr. P. C. Spark. Access—Belmont station, ½ mile; Sutton station, 1½ miles.

London County Asylum, Bexley, Kent. Res. Med. Supt., T. E. K. Stansfield, M.B. Access—Bexley station, 1¼ miles.

London County Asylum, Cane Hill, Coulsdon, Surrey. Res. Med. Supt., Sir. J. M. Moody. Access—Coulsdon, S.E.R., or Stoat's Nest, L.B. & S.C.R., 10 minutes.

London County Asylum, Claybury, Woodford, Essex. Res. Med. Supt., Robert Jones, M.D. Access—Woodford station, G.E.R., 1½ miles.

London County Asylum, Colney Hatch, N. Res. Med. Supt., W. J. Seward, M.B. Access—New Southgate, G.N.R.

London County Asylum, The Manor, Epsom. Res. Med. Supt., W. Ireland Donaldson, M.D. Access—L. & S.W. and L.B. & S.C.R.

London County Asylum, Hanwell. Res. Med. Supt., Dr. P. J. Baily.

London County Asylum, Horton, Epsom. Res. Med. Supt., Dr. J. R. Lord. Access—L. & S.W. Rly., 1½ miles, L.B. & S.C.R., 1¾ miles.

London County Asylum, Long-Grove, Epsom. Res. Med. Supt., C. H. Bond, M.D. Access—L. & S.W.R. and L.B. & S.C.R.

London County Colony, (Insane Epileptics), Ewell, Epsom. Res. Med. Supt., Dr. M. A. Collins. Access—L. & S.W. & L.B. & S.C.R. stations, 1½ miles.

Middlesex County Asylum, Tooting, S.W. Med. Supt., H. Gardiner Hill, M.R.C.S. Access—Wandsworth Common station, 1 mile.

Moorcroft House, Hillingdon, Uxbridge, 2 miles; London, 13 miles. Med. Licensees, Dr. R. J. Stilwell, and Dr. R. H. Cole. Access—West Drayton station, 2 miles.

Newlands House, Tooting Bec Road, S.W. (for gentlemen). Lic. Prop., A. H. Sutherland. Med. Supt., H. J. Hind, M.R.C.S. Access—Balham station, 1 mile, and tram. *See also p.* 946

Northumberland House, Green Lanes, N. Prop., A. H. Stocker, M.D. Res. Med. Supt., Dr. Frank R. King. Access—Finsbury Park station, 1 mile. *See also p.* 947

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., A. H. Sutherland. Lady Supt., Mrs. Chapman. Access—West Kensington station, 1 mile. Barons Court station (Piccadilly Tube), 1 mile. *See also p.* 946

Peckham House, Peckham, S.E. Props., Alonzo H. Stocker and H. G. Stocker. Res. Med. Supt., Harold C. Halsted, M.D. Access—Peckham Rye station, 10 minutes' walk. *See also p.* 944

St. Luke's Hospital, Old St., E.C. Res. Med. Supt., Wm. Rawes, M.D., F.R.C.S. Convenient to principal London stations. *See also p.* 945

The Grange, East Finchley, N. Res. Licensees, Dr. F. and Mrs. Watson.

The Priory, Roehampton, S.W., near Richmond. Res. Med. Supt., James Chambers, M.D. Access—Barnes station, 10 minutes.

West Ham Boro' Asylum, Goodmayes, Ilford. Res. Med. Supt., Dr. D. Hunter. Access—Goodmayes, ¾ mile.

Wood End House, Hayes (ladies). Uxbridge, 3 miles; London, 12 miles. Med. Lic., Dr. Stilwell. Access—Hayes station, 1 mile.

Londonderry.—*District Asylum.* Res. Med. Supt., Dr. Hetherington. Access—Londonderry, 1 mile.

Macclesfield.—*Parkside Asylum.* Res. Med. Supt., T. Steele Sheldon, M.B. Lond. Access—Macclesfield, 1 mile.

Maidstone.—*Kent County Asylum.* Res. Med. Supt., H. W. Lewis, M.D. Access—Maidstone, 1½ miles.

Malling Place and *Winthies Cottage* (for ladies), and *Castle House* (for gentlemen). Res. Med. Supt., Dr. Adam. Access—Malling station, 1 mile.

Market Lavington (Wilts).—*Fiddington House.* Prop., Major Reilly. Res. Med. Supt., Dr. J. Selfe Lush. Access—Lavington, 1½; Devizes, 6 miles.

Maryborough (Queen's County).—*District Asylum.* Res. Med. Supt., Dr. P. Coffey. Access—Maryborough, ½ mile.

Melrose, N.B. — *Roxburgh District Asylum.* Res. Med. Supt., J. C. Johnstone, M.D. Access—Melrose, 1 mile.

Melton. — *Suffolk District Asylum*, near Woodbridge. Res. Med. Supt., J. R. Whitwell, M.B. Access—Melton station, 1¼ miles; Woodbridge station, 2¼ miles.

Middlesbro'.—*County Boro' Asylum.* Res. Med. Supt., Dr. J. W. Geddes. Access—Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum.* Res. Med. Supt., Dr. T. P. Conlon. Access—Monaghan, ¼ ml.

Montrose, N.B. — *Montrose Royal Lunatic Asylum.* Phys. Supt., John G. Havelock, M.D. Access—Hillside, ¼ mile; Dubton, 1 mile.

Morpeth. — *Northumberland County Asylum.* Res. Med. Supt., Thos. W. McDowell, M.D. Access—Morpeth station, 1 mile, by 'bus.

Mullingar. — *District Asylum.* Res. Med. Supt., Dr. A. Finegan. Access—Mullingar station, 1 mile.

Nelson (Lancs.). — *Marsden Hall.* Licensee and Med. Supt., P. G. Mould, M.R.C.S. Access—Nelson station, L. & Y. Rly.

Newcastle-on-Tyne.—*City Asylum*, Gosforth. Res. Med. Supt., James T. Callcott, M.D. Access—Newcastle, 4 miles.

Northampton.—*Berrywood Asylum.* Res. Med. Supt., W. Harding, M.D. Access—Castle station, 2½ miles Midland station, 3 miles.

St. Andrew's Hospital. Med. Supt., J. Bayley, M.R.C.S. Access—Northampton station, 1 mile.

Norwich.—*Heigham Hall.* Res. Phys. and Prop., J. G. Gordon-Munn, M.D; Access—Victoria station, 1 mile. Thorpe station, 1½ miles.

Norfolk County Asylum, Thorpe. Norwich. Res. Med. Supt., D, G. Thomson, M.D. Access—Whitlingham, 1 mile; Norwich 2½ miles.

Norwich City Asylum, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Access—Hellesdon, 1 mile.

The Bethel Hospital for the Insane. Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Access—Norwich (Thorpe) station, 1 mile. *See also p.* 943

The Grove, Old Catton, near Norwich.—(For ladies only.) Res. Med. Supt., C. A. Osburne, F.R.C.S. Apply to the Misses McLintock.

Nottingham.—*City Asylum*, Mapperley Hill. Med. Supt., E. Powell, M.R.C.S.

Notts County Asylum. Med. Supt., S. L. Jones, M.R.C.S. Access—Radcliffe-on-Trent, 2 miles.

The Coppice. Res. Med. Supt., W. B. Tate, M.D. Access—Midland station, 2½ miles; Gt. Northern & Gt. Central station, 1½ miles.

Omagh.—*District Asylum.* Res. Med. Supt., Geo. E. Carre, M.B. Access—Omagh station, 1½ miles.

Oxford.—*Oxford County Asylum.* Res. Med. Supt., T. S. Good, M.R.C.S. Access—Littlemore station.

The Warneford, Oxford, 1½ miles. Res. Med. Supt., James Neil, M.D. Access—Oxford station, 2¼ miles. *See also p.* 949

Paisley.—*Lunatic Ward*, Poorhouse, Craw Road. Vis. Med. Off., D. Fraser, M.D.; Res. Med. Off., Winifred M. Ross, M.B., Ch.B., Access—Paisley, 1 mile.

Paisley District Asylum, Riccartsbar. Med. Off., D. Fraser, M.D. Access—Paisley West, ¼ mile.

Perth.—*District Asylum*, Murthly. Res. Med. Supt., Lewis C. Bruce, M.D. Access—Murthly.

James Murray's Royal Asylum, Perth (for private patients only). Phys. Supt., A. R. Urquhart, M.D., F.R.C.P. Ed. Access—Perth station, under 2 miles. *See also p.* 950

Plympton.—*Plympton House*, Plympton, South Devon. Res. Med. Supt., Dr. Alfred Turner. Access—Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles. *See also p.* 948

Portsmouth.—*Borough Asylum.* Res. Med. Supt., B. H. Mumby, M.D., D.P.H. Access—Fratton, 1½ miles.

Prestwich (nr. Manchester).—*County Asylum.* Res. Med. Supt., Dr. F. Perceval. Acc.—Prestwich, 1 mile.

Rainhill (near Liverpool).—*County Asylum.* Res. Med. Supt., J. Wiglesworth, M.D. Access—St. Helens 2½ miles; Rainhill, 1 mile.,

Rotherham (Yorkshire).—*The Grange*, 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Access—Grange Lane station, G.C.R., ½ mile. *See also p.* 949

Salisbury.—*Fisherton House Asylum.* Med. Supt., Dr. R. T. Finch. Access—Salisbury station, 5 minutes.

Laverstock House. Res. Med. Supt., R. C. Monnington, M.D. Access—Salisbury, 1½ miles.

Sevenoaks (Kent).—*Riverhead House* (for ladies). Res. Med. Supt., Dr. Wm. H. Macartney. Access—Sevenoaks station, S.E.R., ¾ mile.

Shrewsbury.—*Salop & Montgomery Counties Asylum.* Res. Med. Supt., D. F. Rambaut, M.D. Access—Shrewsbury station, 2½ miles.

Sleaford.—*Kesteven County Asylum.* Med. Supt., J. A. Ewan, M.D.

Sligo.—*District Asylum.*—Res. Med. Supt., Dr. Joseph Petit. Access—Sligo station, 1½ miles.

Stafford.—*County Asylum.* Res. Med. Supt., Dr. J. W. S. Christie. Access—Stafford, 1 mile.

Institution for the Insane, Coton Hill. Res. Med. Supt., Dr. R. W. Hewson. Access—Stafford, 1 mile. *See also p.* 951

Starcross (near Exeter).—*Western Counties Training Institution for the Feeble-minded.* Res. Supt., E. W. Locke. Access—Starcross station, G.W.R., 5 minutes.

Stirling.—*District Asylum*, Larbert. Med. Supt., Dr. R. B. Campbell. Access—Larbert, 1½ miles.

St. Albans (Hill End).—*Herts County Asylum.* Med. Supt., A. N. Boycott, M.D. Access—Hill End station, G.N.R., 2 minutes.

St. Leonards-on-Sea.—*Ashbrook Hall*, Hollington (for ladies). Res. Lics., Mr. and Mrs. Charles Somerset. Med. Supt., Dr. J. Farrant Fey. Access—Warrior Square station, 2 miles.

Stone (near Aylesbury). — *Bucks County Asylum.* Res. Med. Supt., H. Kerr, M.D. Access—Aylesbury station, 3¼ miles.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Prop., E. Hollins, M.A., J.P. Access — Tamworth station, ¾ mile. *See also p.* 953

Taunton.—*Somerset & Bath Asylum,* Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Access —Norton Fitzwarren station, 2 miles.

Ticehurst (Sussex).—*Asylum.* Props., Drs. H. & A. Newington. Access—Ticehurst Road 3 miles, Wadhurst S.E. & C.R., 4 miles.

Tonbridge. — *Redlands.* Res. Med. Supt., W. A. Harmer, L.S.A. Access —Tonbridge junc., S.E. & C.R., 2½ miles.

Virginia Water. — *Holloway Sanatorium,* Hospital for the Insane. St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., G. W. Smith, M.B., C. E. C. Williams, M.D., Sylvia R. M. Blackstone, M.B. Access—Virginia Water station, 5 mins. Seaside Branch, Hove Villa, Dyke Road, Brighton. Med. Off., E. Rivaz Hunt, M.D.
See also p. 950

Wadsley (near Sheffield). — *South Yorkshire Asylum.* Res. Med. Supt., W. S. Kay, M.D. Access—Wadsley Bridge, 1 mile.

Wakefield.—*West Riding Asylum.* Res. Med. Supt., J. Shaw Bolton, M.D. Access—Kirkgate and Westgate station, 1 mile.

Wallingford (Berks).—*Berkshire Asylum.*—Res. Med. Supt., J. W. A. Murdoch, M.B. Access—Cholsey, 1 mile.

Warlingham (Surrey).— *Croydon Mental Hospital.* Res. Med. Supt., E. S. Pasmore, M.D. Access—Croydon, 6 miles; Upper Warlingham, 3¼ miles. *See also p.* 942

Warwick.—*Midland Counties Asylum,* Knowle, near Birmingham (for feeble-minded children). Sec. and House Gov., A. H. Williams. Med. Off., J. O. Hollick, M.B., M.R.C.S. Access—Knowle, ½ mile.

Waterford.—*District Asylum.* Res. Med. Supt., J. A. Oakshott, M.D. Access—G. S. & W. R., North station, 2 miles

St. Patrick's Institution, Belmont Park. Conducted by the Brothers of Charity. Med. Supt., W. R. Morris, M.B.

Wells.—*Somerset and Bath Asylum,* Wells, Som. Res. Med. Supt., Dr. G. Stevens Pope. Access—Wells station, 1½ miles; Masbury station, 2½ miles.

Whitchurch (Salop). — *St. Mary's House* (ladies only). Res. Med. Supt., C. H. Gwynn, M.D. Access—Whitchurch, 1 mile.

Whitefield (near Manchester).—*Overdale.* Res. Phys., P. G. Mould, M.R.C.S. Access—Prestwich and Whitefield station, 1½ miles; Molyneux Brow, ½ mile.

Whittingham (nr. Preston).—*County Asylum.* Res. Med. Supt., Dr. J. F. Gemmel. Access—Grimsargh station, 1¾ miles; Whittingham station, 3 minutes.

Winchelsea (Sussex).—*Periteau,* near Hastings (5 ladies). Prop., Mrs. R. V. Skinner. Med. Supt., E. W. Skinner, M.D. Access—Winchelsea station, 1 mile.

Witham (Essex).—*The Witham Asylum* (for males). Licensee, Dr. H. E. Haynes. Res. Med. Supt., Dr. J. P. Race. Access—Witham station, ½ mile.

Woking. — *Surrey County Asylum,* Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Access—Brookwood station, 1¼ miles.

Worcester.—*County & City Lunatic Asylum,* Powick. Res. Med. Supt., Dr. G. M. P. Braine-Hartnell. Access—Worcester station, 4 miles.

York.—*The Pleasaunce* (ladies only). Prop. & Med. Supt., G. I. Swanson, M.D. Access—York, 1½ miles.
See also p. 951

The Retreat. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). Access—York station, 1½ miles. Also Throxenby Hall, a branch house, near Scarborough.
See also p. 942

Bootham Park Registered Hospital, York. Res. Med. Supt,. C. K. Hitchcock, M.D., M.A. Cantab. Access—York station, 1 mile.

North Riding of Yorkshire Asylum, Clifton. Res. Med. Supt., A. I. Eades. Access—York, 2 miles.

TRAINING INSTITUTIONS.

Bath.—*Magdalen Hospital School* (for idiot and imbecile children). Med. Off., D. L. Beath, M.R.C.S. Clerk, E. N. Fuller, LL.B., 5, Old King St., Bath. Access—G.W.R. 1½ ml.

Bristol.—*Stoke Park Colony*, Stapleton (for mentally defective children). Apply to Secretary, National Institutions for Persons requiring Care and Control, 14, Howick Place, Westminster, S.W. *See also p.* 905

Coulsdon (Surrey).—*Stresa*, Fanfare Road (for backward and feeble-minded patients). Res. Med. Supt., Dr. Fletcher Beach. Access—Coulsdon station, S.E. & C.R., 15 minutes.

Dublin.—*Stewart Institution*, Palmerston, Chapelizod, Co. Dublin (for imbecile children). Med. Supt., Dr. F. E. Rainsford.

Dundee.—*Baldovan Institution* (for the training, treatment and education of imbecile children). Matron, Miss Henry, Med. Supt., D. M. Greig, F.R.C.S. Access—Baldovan, 1 ml.

Kingston-on-Thames (Surrey).—*Normansfield, Trematon & Conifers* (for backward and feeble-minded of either sex). Res. Med. Supt., Dr. Langdon Down. Access—Hampton Wick station, 8 minutes.

Lancaster.—*The Royal Albert Institution* (for the feeble-minded of the Northern Counties; 715 patients). Res. Med. Supt., Dr. A. R. Douglas. Secretary, Saml. Keir. Access—Lancaster station, 1 mile; and *Brunton House*, a Private Home in connection with the Royal Albert Institution.

See also p. 953

Larbert (Stirlingshire). — *Scottish National Institution* (for education of imbecile children). Res. Supt., A. A. Skene. Med. Officer, Dr. R. D. Clarkson. Sec. & Treas., A. J. Fitch, Virginia Buildings, Glasgow. Access—Larbert station, ¾ mile.

SANATORIA FOR CONSUMPTION, AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.).—*Inverness-shire Sanatorium.* Med. Supt., D. S. Johnston, M.D.

Aysgarth, S.O. (Yorks). — *Wensleydale Sanatorium.* Med. Supt., Edwd. M. Hime, M.B., Ch.B., Access—Aysgarth, ½ mile, via Northallerton, N.E.R., and Hawes Junction, M.R. *See also p.* 932

Banchory (Scotland).—*Nordrach-on-Dee.* Res. Phys., D. Lawson, M.A., M.D. Access—Banchory station, 1½ miles.

Barrasford (Northumberland).—*The Newcastle-on-Tyne* and *Northumberland Sanatorium.* Res. Med. Off., Dr. W. C. Rivers. Access—Barrasford, N.B.R., 4 miles.

Belbroughton (Worcs.). — *Bourne Castle Open-air Sanatorium.* Apply Res. Phys., W. Bernard Knobel, M.D. Access—Hagley, G.W.R.; Bromsgrove, M.R.

Benenden (Kent). — *Sanatorium* of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis." Two Res. Med. Officers. Apply, Secretary. Access—Biddenden station, 3 miles.

Bingley (Yorks.). — *Eldwick Sanatorium*, for women and children. Vis. Phys., Dr. Margaret Sharp. Access—Bingley station, 2 miles.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest.* Sec., A. G. A. Major. Res. Phys., Dr. Henry Holroyd. Access — Bournemouth station, 1 mile. Terms 7/6 per week and a Governor's nomination.

The Firs Home (for advanced cases). Hon. Sec., H. Gunton Turner, M.R.C.S., Bournemouth, Hon. Med. Offs., P. J. Duncan, M.D., and S. G. Champion, M.D. Lady Supt., Miss MaGuire. Access Bournemouth Central, ½ mile.

The Home Sanatorium, West Southbourne, near Bournemouth. Res. Med. Supt, J. E. Esslemont, M.B., Ch.B. Access—Bournemouth Central, 2½ miles; Boscombe, 1½ miles; Christchurch, 2½ miles.
See also p. 930

West Howe, Kinson, Bournemouth. Res. Phys., Dr. W. Denton Johns. Access—Bournemouth Central, 3 miles. *See also p.* 928

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland.* Hon. Sec., J. P. Maclay, Esq., 21, Bothwell Street, Glasgow. Med. Supt., John Guy, M.D. Access—Bridge of Weir, 2 miles.

Brighton. — *Municipal Sanatorium*, for Brighton townsfolk. Objects: educational, and for treatment of both early and advanced cases. Med. Supt., Dr. Duncan Forbes, M.O.H. for Brighton. Particulars, Town Hall, Brighton.

Chagford (Devon).—*Dartmoor Sanatorium* (near Exeter, Newton Abbot, and Okehampton). Res. Med. Supt. and Prop., Dr. A Scott Smith. Access—Moretonhampstead, G.W.R., 6 miles; Okehampton station, L. & S.W.R., 11 miles.
See also p. 931

Cheddar (Somerset).—*Engel Home*, for gentlewomen and girls. Med. Supt., R. W. Statham, M.R.C.S. Apply to Lady Supt. Access—Cheddar station, 10 minutes.

Cheltenham.—*Cotswold Sanatorium*, Res. Phys., Dr. F. K. Etlinger. Address — Cotswold Sanatorium. near Stroud. *See also p.* 930

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. A. K. Traill. Access—Leckhampton, 2½ miles.

Chesterfield (Derbyshire).—*The Ashover Sanatorium.* Med. Supt., Dr. Ida E. Fox. Access—Stretton, M.R., 3½ miles.

Crieff (Perthshire).—*Ellerslie Sanatorium.* Res. Prop., Thompson Campbell, M.D. Access—Caledonian Railway, Crieff station, ½ mile.

Darlington.—*Felix House.* Middleton St. George, Co. Durham. Med. Supt., C. S. Steavenson, M.B. Access—Dinsdale, N.E.R., 5 mins.
See also p. 930

Devon and Cornwall *Sanatorium*, Didworthy, South Brent. For consumptive poor of the two counties. Hon. Sec., S. Carlile Davis, Esq., Princess Chambers, Princess Sq., Plymouth. Res. Med. Supt., Dr. W. B. Livermore. Access — Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork County Sanatorium*, Heatherside. Res. Med. Supt., Dr. R. Ahern. Access —Buttevant, 4 miles.

Dorking (Surrey). — *Woodhurst Sanatorium* (for women and girls only), Tower Hill. Sec., Mrs. G. Wright. Visiting Phys., Miss Mary R. McDougall, M.B., C.M. Ed. Access—L.B. & S.C.R. and the S.E. stations, both about 1 mile.

Dundee (nr.), *Sidlaw Sanatorium*, Res. Med. Off., Dr. H. E. Watson. Access—Auchterhouse stat. 1½ mls.

Durham.—*Durham County Consumption Sanatoria.* Sec., Mr. F. Forrest, 54, John Street, Sunderland. Terms free and by payment. For men: Stanhope, Med. Supt., Dr. John Gray. Access—Stanhope station, 1 mile. For women and girls: Wolsingham, Med. Supt., Dr. Menzies. Access — Wolsingham station, ¾ mile.

Edinburgh.—*Royal Victoria Hospital for Consumption.* For the treatment of poor patients. Visiting Physicians, Dr. R. W. Philip and Dr. G. L. Gulland. Clerk and Treasurer, 4a, St. Andrew Square, Edinburgh.

Woodburn Sanatorium, Morningside. Res. Med. Prop., Mrs. I. Mears, L.R.C.P.I.

Eversley (Hants).—*Moorcote Sanatorium.* Res. Med. Supt., J. G. Garson, M.D. Access—Wellington College station, 4½ miles; Wokingham sta., 6 miles; Fleet, 6 miles.
See also p. 932

Farnham (Surrey). — *Crooksbury Sanatorium.* Res. Phys., Dr. F. Rufenacht Walters and Dr. H. Wilson. Access—Farnham station, 3½ miles; Tongham, 2½ miles; Ash, 4 miles. *See also p.* 929

Whitmead Sanatorium, Tilford. Res. Phys., J. Hurd-Wood, M.D. Access—Farnham station, 3½ miles.
See also p. 932

Fortbreda, Belfast.—*Forster Green Consumption and Chest Hospital.* Res. Phys., Dr. C. Alexander. Sec., A. Shaw, 2, May Street, Belfast, Access—Belfast, 2 miles. Mainly for the poor ; 6 beds free ; others by small payment.

Frimley (Surrey).—*Brompton Hospital Sanatorium.* Res. Med. Supt., Dr. Marcus Paterson. Access—Frimley station, 2 miles.

Grange-over-Sands.—*Westmorland Sanatorium.* Res. Med. Supt., Dr. J. C. Macgown. Access—Grange-over-Sands station, 2¾ miles.

Hastings.—*Fairlight Sanatorium.* in connection with Margaret Street Hospital for Consumption and Diseases of the Chest (for Out-Patients), 26, Margaret Street, London, W. Sec., Alice M. Greg. Med. Off., Dr. N. F. Stallard. Access—Hastings, Tram, about 15 minutes. Payments: by subscriber's letter, 11/6, without, 17/6

Hull.—*Hull and East Riding Convalescent Home.* Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproulle, L.R.C.P. Access—Withernsea stat.

Isle of Wight. — *Royal National Hospital for Consumption*, Ventnor. Res. Phys., Dr. James C. Gilchrist. Sec., Ernest Morgan, 18, Buckingham Street, Strand, W.C. Terms 10/- per week and a recommendation from a Governor. Access—Ventnor, 1 mile.

St. Catherine's Home, Ventnor (for advanced cases). Apply to the Sister-in-Charge. Med. Off., H. F. Bassano, M.A., M.B. Access—Ventnor, 5 mins. drive. Terms, by selection, 10/6 per week.

Kinross-shire (Scotland).—*Coppin's Green Sanatorium* and *Ochil Hills Sanatorium.* Med. Supt., J. E. Chapman, M.R.C.S. Access—Kinross junction, 4 miles.

Lanark.—*Bellefield Sanatorium.* Res. Med. Supt., Dr. J. W. Allan.

Leeds.—*Leeds Sanatorium for Consumptives*, Gateforth, near Selby, and *Leeds Hospital for Consumptives*, Armley. Sec., C. H. Sedgwick, 37, Great George St., Leeds. Terms free, for poor of Leeds.

Liverpool.—*Liverpool Sanatorium for Consumptives*, Kingswood, Frodsham. Sec., Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Phys., Dr. H. H. Thomson. Access—Frodsham station, L. & N.W.R., 3½ miles.

Llanybyther (Carmarthenshire). — *West Wales Sanatorium.* For the Counties of Carmarthen, Cardigan, and Pembroke. Res. Med. Supt., Dr. B. Adams. Access—Llanybyther station, 3 miles.

London.—*City of London Hospital for Diseases of Chest*, Victoria Park, E. Open-air treatment provided. Res. Med. Off., Dr. W. W. Jameson, Sec., Geo. Watts. Access—Cambridge Heath, G.E.R., 5 minutes.

Mount Vernon Hospital for Consumption and Diseases of the Chest, Hampstead. Access—Finchley Road (Met.) station, 1 mile. *Country Branch Hospital at Northwood.* Access—Northwood (Met. & G.C. Rly.) Hon. Vis. and Res. Staff. Free on recommendation of governors. Secretary, W. J. Morton.

Royal Hospital for Diseases of the Chest, 231, City Road, E.C. Med. Off., Dr. H. O. West. Apply to the Secretary.

Long Stratton (Norfolk).—*Fritton Sanatorium*, The Beeches. Med. Director, Dr. Annie McCall, 165, Clapham Road, S.W. Access—Forncett station, G.E.R., 4 miles.

Manchester.—*Hospital for Consumption and Diseases of Throat and Chest.* Hospital at Bowdon; Crossley Sanatorium, Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester. Res. Phys. (Bowdon), Dr. D. P. Sutherland; (Delamere), G. Heathcote, L.R.C.P. & S. Access—Bowdon: Altrincham station, ½ mile. Delamere: Mouldsworth or Frodsham, 3½ miles.

Margate (Kent).—*Royal Sea-bathing Hospital* (for Surgical Tuberculosis) Sec., A. Nash, 13, Charing Cross, S.W. Access — Margate West, ¼ mile. *See also p.* 928

Mendip Hills.—*Mendip Hills Sanatorium*, Wells, Somerset. Res. Phys., D. J. Chowry Muthu, M.D. Access—Wells station, 2¾ miles.
See also p. 928

Mendip Hills.—*Nordrach-upon-Mendip*, Blagdon, near Bristol. Res. Phys., R. Thurnam, M.D. Access—Burrington station, 5 miles.

Midhurst (Sussex).—*King Edward VII Sanatorium.* Res. Med. Supt. N. D. Bardswell, M.D.

Nayland (Suffolk). — *East Anglian Sanatorium*, and *Maltings Farm Sanatorium* for poor men and women patients. Med. Supt., Dr. Jane Walker, 122, Harley Street, W. Access—Bures station, G.E.R., 3½ miles.

New Cumnock (Ayrshire).—*Ayrshire Sanatorium*, Glenaften. Res. Med. Supt., E. E. Prest, M.D. Access—New Cumnock, 3 miles.

Norfolk.—*Kelling Sanatorium*, Holt. Assistance given to poor patients unable to pay. Hon. Sec., Dr. H. W. McConnel. Res. Med. Off., Mr. J. I. W. Morris. Access—Holt station, Norwich, 1½ miles.

Mundesley Sanatorium, Mundesley. Res. Physician, S. Vere Pearson, M.B. Access—Mundesley station, 1 mile.

Northallerton (Yorks). — *Ruebury Sanatorium*, Osmotherley. Res. Med. Prop., H. B. Luard, F.R.C.S. Access—Northallerton, N.E.R., 8 miles, Trenholme Bar, 4 miles.
See also p. 931

Nottingham.—*Ransom Sanatorium*, Sherwood Forest, Mansfield, for persons of limited means, resident in Notts and district. Res. Med. Off., Dr. Jean Paton Gordon. Access—Mansfield, 3 miles. Free, or 10/- per week, on recommendation of subscribers.

Oban, Scotland. — *Argyll County Sanatorium.* Vis. Med. Off., Duncan MacDonald, M.D. Hon. Sec., Roger McNeill, M.D. Access—Oban, 1 mile.

Ockley *Sanatorium* (Surrey). Res. Phys., Dr. Clara Hind. Access—Ockley, L.B. & S.C.R., 1 mile.

Painswick (Glouc'stershire).—*Painswick Sanatorium*, Cotswold Hills. Res. Phys. and Prop., W. McCall, M.D. Access—Stroud, 4 miles; Gloucester, 6 miles.

Penmaenmawr (N. Wales).—*Nordrach in Wales, Pendyffryn Hall.* Res. Phys., Dr. R. C. Macfie and Dr. Gill Dobson. Apply, Secretary.

Peppard Common (Oxon).—*Kingwood Sanatorium*, for ladies; *Maitland Sanatorium*, for working classes. Med. Supt., Dr. Esther Carling. Access—Reading station, 6½ miles.

Ringwood (Hants).—*Linford Sanatorium.* Props. and Res. Phys. R. M. Smyth, M.D., and H. G. Felkin, M.D. Access—Ringwood station, 2½ miles.

Rudgwick (Sussex). — *Rudgwick Sanatorium.* Vis. London Phys., Dr. Annie McCall. Access—Rudgwick station, 5 minutes; Horsham station, 7 miles.

Ruthin (N. Wales).—*Vale of Clwyd Sanatorium, Llanbedr Hall.* Res. Prop., Dr. G. A. Crace-Calvert. Access—Ruthin station, 2 miles.
See also p. 931

Sandon, near Chelmsford (Essex).—*Merivale Sanatorium.* Res. Phys., H. N. Marrett, M.R.C.S. Access—Chelmsford stat., G.E.R., 3½ miles.

Sheffield. — *City Hospitals for Consumptives* (for males), Commonside; (and for females), Crimicar Lane. Med. Supt., H. J. E. H. Williams, M.D.

Skipton (Yorks).—*Eastby Sanatorium*, for males. Conducted by Bradford Board of Guardians. Med. Supt., B. H. Slater, F.R.C.S. Res. Med. Off., Miss Kidd, M.B. Access—Embsay station, 2 miles.

St. Leonards.—*Eversfield Chest Hospital*, West Hill. Hon. Sec., Geo. E. Hopwood. Res. Phys., T. Gambier, M.D. Fee, 10/- weekly, with subscriber's letter, available 4 weeks. Access—West St. Leonards S.E.R., West Marina L.B. and S.C.R., within 5 minutes' walk.

Threlkeld (Cumberland). — *Blencathra Sanatorium.* Res. Med. Supt., Dr. W. Goodchild. Access—Threlkeld, C.K. & P.R. 2 miles.

Torquay.—*Mildmay Consumptive Home* for advanced cases only. Hon. Med. Offs., F. D. Crowdy, M.D., and H. P. Wiggin, M.R.C.S. Hon. Sec., Miss F. Gumbleton, Connemara, Torquay. Access—Torquay, 1 mile. Fees, 10/6 weekly, or 7/- with subscriber's letter.

Western Hospital. Open Oct. to May. Sec. F. Manley. Terms, 7/6 weekly by nomination, 12/6 without.

Warrenpoint (Co. Down).—*Rostrevor Sanatorium.* Res. Phys., B. H. Steede, M.D. Access—Warrenpoint. *See also p.* 930

Wicklow.—*Altadore Sanatorium,* Kilpedder, Co. Wicklow. Res. Phys., Dr. J. C. Smyth. Access—Dublin to Greystones, from which it is 5 miles.

The Royal National Hospital for Consumption for Ireland, Newcastle, Wicklow. Hon. Sec., J. R. Orpen, 13, South Frederick Street, Dublin. Res. Phys., J. T. Crowe, L.S.A. Access—D. & S.E.R. to Newcastle, Co. Wicklow, 3 miles. Minimum fees, 7/- weekly, on subscriber's recommendation and medical examination.

Winsley, near Bath.—*Winsley Sanatorium.* For residents in the Counties of Bristol, Gloucester, Somerset and Wilts. Res. Med. Off., Leonard Crossley, M.D. Sec., Frederic Jones. Access—Limpley Stoke station, 1 mile.

Wokingham.—*London Open-air Sanatorium,* Pinewood. Sec., H. W. Harris, 20, Hanover Square, W. Access—Wellington College, S.E.R., 2 miles; or Wokingham, S.W.R., 3½ miles.

Yelverton (South Devon). *Udal Torre Sanatorium.* Res. Med. Supt. and Prop., J. Penn Milton, M.R.C.S.

INSTITUTIONS FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879–1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an "Inebriate" within the meaning of the Acts.

* NOTE:—Ashford and Chiswick are Roman Catholic Religious Institutions.

† Cinderford, Herne Hill, Terrington St. Clement, and Torquay, are C.E.T.S. Institutions.

MALES ONLY.

Buntingford (Herts). — *Buntingford House Retreat.* Two Res. Physicians. Access—Buntingford, G.E.R., 8 minutes. *See also p.* 936

Cinderford† (Glos.).—*Abbotswood House Inebriate Retreat.* Res. Hon. Supt., F. Eardley-Wilmot. Access—Ruspidge or Cinderford.

Cockermouth (Cumberland).—*Ghyllwoods.* Res. Med. Prop., Dr. J. W. Astley Cooper. Access—Cockermouth, 11 miles. *See also p.* 934

Colinsburgh (Fife).—*Invernith Lodge.* Res. Med. Supt. and Licensee, Dr. W. H. Bryce. Access—Kilconquhar station, 4½ miles. *See also p.* 933

Dinas Mawddwy (Merionethshire).—*Plas-yn-Dinas.* Res. Med. Supt. and Licensee, Dr. W. F. Walker, J.P. Access—Cemmes Road, 8 miles; Dolgelly, 9 miles. *See also p.* 935

Folkestone.—*Capel Lodge,* near Folkstone. Res. Prop., E. Norton, M.D. Access — Folkestone Junction, 2 miles. *See also p.* 938

Rickmansworth (Herts).—*Dalrymple House.* Res. Med. Supt., F. S. D. Hogg, M.R.C.S., L.R.C.P. Access—Rickmansworth station, Great Central & Metropolitan Railway, ½ mile; L. & N.W.R., 1 mile. *See also p.* 936

FEMALES ONLY.

Ashford, near Staines.*—*Ecclesfield.* Med. Supt., Dr. M. F. Cock. Apply to the Mother Superior. Access—Ashford station, 1 mile. *See also p.* 934

Beverley (E. Yorks).—*Albion House.* Res. Supt., the Matron. Hon. Sec., Mrs. T. R. Pentith, The Limes, Sutton-on-Hull. Hon. Phys., Geo. Savege, M.D.

Brighton.—*Park Gate*, Preston Road. Lady Supt., Sister Mary. Med. Off., R. J. Ryle, M.D., J.P.

Chiswick.*—*St. Veronica's Retreat.* Under the care of the Sisters of Nazareth. Med. Supt., John J. Atteridge, M.D. Access—Chiswick station, ½ mile.

Dairsie, by Cupar (Fife).—*Invereden Sanatorium.* Res. Phys., Dr. J. Q. Donald. Access—Cupar station.

Erdington, nr. Birmingham.—*Corngreaves Lodge.* Hon. Sec., J. H. Broscomb, Lyncourt, Kingsbury Road, Erdington, Warwickshire. Access — Gravelly Hill station, ¼ mile. *See also p.* 937

Fallowfield. — *The Grove Retreat*, near Manchester. Licensee, Mrs. M. Hughes. Med. Offs., A. T. Wilkinson, M.D., J. W. Hamill, M.D., G. Ashton, M.D., and Dr. Florence Robinson. Hon. Treas., S. Gamble. Access—Fallowfield station, 10 minutes. *See also p.* 938

Herne Hill.†—*Ellison Lodge*, Half Moon Lane. Res. Supt., Miss Corner. Med. Supt., Dr. T. H. Underhill. Access—Herne Hill, 10 minutes.

Leicester.—*Melbourne House*, Prop., Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D., Camb. Dublin Consultant, Sir. Wm. J. Smyly, M.D., F.R.C.P.I., 58, Merrion Square, Dublin. Nat. Tel., 769 Leicester. Station, 2 miles. *See also p.* 934

Newmains (N.B.).—*Newmains Retreat* for ladies. Licensed under Inebriates Acts. Access—Hartwood stat., Cal. Railway. *See also p.* 937

Reigate (Surrey). — *Duxhurst*, for women of all classes. Supt., Sister in charge. Med. Supt., A. Walters, M.R.C.S. Access—Reigate, 4 miles. *See also p.* 937

Spelthorne St. Mary (Bedfont, Middlesex). — Apply to Sister Superior, C.S.M.V. Access—Feltham, S.W.R., 1 mile.

Licensed under Inebriates Acts. Females—Primarily Gentlewomen and Middle Class (24). Treatment—Physical, Moral, and Spiritual.

See also p. 937

Terrington St. Clement† (Norfolk). —*Hamond Lodge.* Res. Supt., the Sister in Charge. Med. Supt., S. R. Lister, M.R.C.S. Access—Terrington station, 1½ miles.

Torquay.† — *Temple Lodge.* Res. Supt., Sister in Charge. Med. Off., W. Odell, M.D., F.R.C.S. Hon. Sec., Mrs. H. H. Erskine.

Wandsworth. — *Northlands Retreat*, 20, Bolingbroke Grove, Wandsworth Common, S.W. Lics., Dr. J. Round and the Misses Round. Access — Wandsworth Common station, L.B. & S.C.R.

Telephone—No. 1065 Battersea.

REFORMATORIES CERTIFIED UNDER THE INEBRIATES ACT, 1898.

Male and Female.

Bristol.—*Brentry certified Inebriate Reformatory*, Westbury-on-Trym. Res. Supt., Capt. Lay; Med. Officer, Dr. Ormerod. Hon. Sec., Rev. H. N. Burden. Access—Clifton Down, Redland, or Patchway station, 3½ miles.

Cattal (Yorkshire).—*Yorkshire Inebriate Reformatory*, Cattal, near York. For Yorkshire cases. Res. Supt. and Med. Off., Dr. F. P. Hearder. Access—Cattal, 1 mile.

Females Only.

Ackworth (Yorkshire).—*North Midlands Inebriate Reformatory.* Res. Supt., the Officer in Charge. Med. Off., Dr. Oyston. Access—Ackworth station, 1½ miles.

Bristol.—*Royal Victoria Home*, Horfield. Med. Off., Dr. John Ambrose. Hon. Sec., Rev. H. N. Burden. Access—Montpelier and Bristol stations.

Chesterfield (Derbyshire).—*Midland Counties Inebriate Reformatory*, Whittington. Med. Off., Dr. A. M. Palmer. Access — Whittington station, ½ mile; Chesterfield, 5 miles.

East Harling (Norfolk). — *Eastern Counties Inebriate Reformatory*, East Harling, near Thetford. Res. Med. Supt., Dr. Fleck. Access—Harling Road station, 3½ miles.

Horley (Surrey).—*Farmfield*. For London cases, under Sec. II of the Act. Res. Supt., Miss Forsyth. Med. Off., Dr. C. F. Williamson. Access—Horley station, 2½ miles.

Langho (Lancashire). — *Lancashire Inebriate Reformatory*, Langho, near Blackburn. For Lancashire cases. Res. Supt. and Med. Off., Dr. F. A. Gill. Access—Langho station, 1½ miles.

UNLICENSED HOMES.

Beckenham (Kent).—*Norwood Sanatorium*, The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Access — Beckenham Junction station, 10 minutes.
See also p. 938

Carnoustie (N.B.)—*The Lodge*, Apply to the Secretary.

Durham.—24, Allergate, for friendless and inebriate women; 4/- per week. Hon. Sec., Miss King. Med. Supt., Dr. Smith. Access—Durham, ½ mile.

Edinburgh.—*Queensberry Lodge*, for ladies. Supt., A. Miller. Med. Supt., Dr. William Russell. Access—Waverley station, ½ mile.
See also p. 936

Harrogate (Near).—*Hill House*, Starbeck, Yorks., for women. Apply, Matron. Access—Starbeck station, ½ mile.

Heybridge, (Essex). — *Osea Island*, for ladies and gentlemen. Res. Phys., Dr. Ewens. Prop., F. N. Charrington, Esq.

Hounslow (Middlesex).—*West Holme*, for middle class and working women. Med. Supt., Dr. G. A. S. Gordon. Access—S.W. & Dist. Rly., ¼ mile.

Liverpool.—*Temperance Home*, 318, Upper Parliament Street, for women. Supt., Miss A. J. Wilson. Med. Officer, C. E. Soloman, M.D. Access—Edge Hill station.

HYDROPATHIC ESTABLISHMENTS.

We wish to make this list complete, but it is impossible when some Proprietors do not return our letter of enquiry, which is *stamped for reply*. This will account for some omissions in the present edition.

Aberdeen. — *Deeside Hydropathic*, Murtle, near Aberdeen. Access—Rail to Aberdeen, thence to Murtle station on the Deeside line.

Baslow.—*Grand Hotel and Hydro.* Access—Bakewell station, 4½ miles; Grindleford, 5 miles.

Ben Rhydding. — *Ben Rhydding Hydro.* Phys., Thos. Scott, M.D., and Dr. W. R. Bates. Access—Station, a few hundred yards.

Bexhill-on-Sea.—*Wilton Court Hotel and Hydro.* Proprietress, Mrs. Sewell.

Bournemouth (Hampshire).—*Bournemouth Hydropathic.* Res. Phys., W. J. Smyth, M.D. Access—East station, 1½ mile; West station, ¼ mile.

Bridge of Allan.—*Bridge of Allan Hydropathic Co.* Manageress, Mrs. Gregory. Res. Med. Supt., Dr. C. F. Steele. Access — Station, ¼ mile.
See also p. 918

Bristol. — *The Bristol Hydropathic* (formerly Bartholomew's Turkish Baths), College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S.

Bute.—*Kyles of Bute Hydropathic,* Port Bannantyne, Rothesay. Man., A. Menzies. Med. Supt., Dr. A. J. Hall. Access—Clyde steamers call daily.

Buxton.—*Buxton Hydro.* Manager, G. W. Bosworth. Access—Station, 4 minutes. *See also p.* 921

Corbar Hill Hydro, Clarendon House. Man., Miss L. Adams. Access—Buxton station, 5 minutes.

Haddon Hall Hydro. Managing Director, John Little.

See also p. 920

Caterham (Surrey). — *Surrey Hills Hydropathic.* Res. Med. Supt., A. B. Olsen, M.D. Access—Caterham station

Clifton (near Bristol).—*Clifton Grand Spa and Hydropathic.* Access—Clifton Down station, 1 mile; Bristol station, 1½ miles.

Cork.—*St. Ann's Hill Hydropathic.* Res. Phys., M. Orb, M.D., Erlangen (Germany). Access—Blarney sta., 2½ miles; Muskerry Light Railway from Cork, station on grounds.

Crieff.—*Strathearn House* (17 miles from Perth). Res. Med. Supts., Thos. H. Meikle, M.D., J.P., and T. Gordon Meikle, M.B., C.M. Access—Crieff station, 1 mile.

Dunblane.—*Philp's Dunblane Hydropathic,* Perthshire. Res. Phys., Dr. S. M. Sloan. Access—Dunblane station, ¾ mile.

Eastbourne. — *Eastbourne Hydropathic.* Manager, W. J. Grimes. Access — Eastbourne station, 5 minutes' drive.

Edinburgh.—*Hydropathic,* Slateford. J. Bell, Man. Dir. Access—Merchiston, 1 mile; Waverley, 3 miles.

Eversley (Hants). — *Bad-Nauheim* Kuranstalt for the treatment of heart, nervous and rheumatic affections. Director, J. G. Garson, M.D. Access—Wellington College station, 4½ miles; Fleet, 6 miles. *See also p.* 932

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Access—Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands. — *Hazelwood Hydropathic.* Physicians, Richard Lowther, M.D., and Owen Gwatkin, M.R.C.S. Access—Carnforth, L. & N.W.R., and thence by Furness Railway; Grange-over-Sands, ¼ mile.

Harrogate (Yorkshire).—*The Cairn Hydropathic.* Near Leeds and Bradford. Man., Mrs. Baker. Access—Harrogate station, ½ mile. 5 minutes from Royal Baths and Pump Room. *See also p.* 911

The Harlow Manor Hydro. Man., Miss Oakley. Med. Supt., Dr. Dimmock.

The Harrogate Hydropathic. Phys., Drs. T. Johnstone and R. McLeod Veitch. Access—Harrogate station, ½ mile.

Hexham (Northumberland).—*Tynedale Hydropathic.* Prop., F. G. Grant. Med. Supt., Dr. Stewart. Access—Hexham, 1 mile; Newcastle, 19 miles.

Ilfracombe.—*The Cliffe Hydro.* Med. Supt., Chas. Toller, M.D. Apply to the Secretary. Station, 1 mile.

Ilkley (Yorkshire). — *Craiglands Hydro., Lim.* Res. Med. Supt., Henry Dobson, M.D., C.M.

The Spa Hydropathic, near Leeds and Bradford. Manageress, Mrs. Robertson. Med. Supt., Dr. T. B. Hearder. Access—Ilkley, 3 mins.

Leicester.—*The Leicester Sanitarium,* 82, Regent Road. Med. Supt., A. B. Olsen, M.D.

Limpley Stoke (near Bath).—*West of England Hydropathic.* Res. Med. Supt., — — — — Access—Limpley Stoke station.

London. — *Alexandra Therapeutic Institute,* 126, Gt. Portland Street, W. Under Medical Supervision. Complete range of Baths, Massage, Electrical treatment, etc.

See also p. 920

Nevill's Turkish Baths, Charing Cross, W.C. Light Baths, Douches, Electric Baths, Vibro-Massage, etc. *See also p.* 918

Malvern.—*The Malvern Hydropathic.* Res. Prop., Dr. J. N. F. Fergusson. Access—Great Malvern station, ¼ mile. *See also p.* 916

Malvern.—*Wyche-side Hydropathic.* Res. Phys., — Access—Malvern Wells station, G.W.R., ½ mile; Great Malvern station, 2 miles.

Matlock. — *Matlock House Hydropathic,* Matlock. Physician, W. Moxon, M.D., J.P. Access—Matlock, M.R., ¼ mile.

Rockside Hydropathic, Matlock. Med. Supts., Drs. M. K. Nelson (Resident) and Marie Goodwin. Access—Matlock, ¾ mile.
See also p. 914

Royal Hotel and Baths, Matlock Bath. Phys., W. C. Sharpe, M.D. Access—Matlock Bath station.

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Access—Matlock station, ½ mile; omnibus.
See also p. 913

Moffat.—*The Moffat Hydropathic.* Man., Miss Gardner. Med. Supt., Dr. Huskie. Access—Moffat station, 1 mile.

Peebles.—*Peebles Hotel Hydropathic.* Complete modern equipment of baths and electrical treatment. Plombières treatment for mucous colitis, and Bourbon Lancy treatment for heart disease. Fango di Battaglia (Mud packs for sciatica, etc.) Res. Phys., Thomas D. Luke, M.D., F.R.C.S.Edin.
See also p. 915

Rothesay. — *Glenburn Hydropathic.* Med. Supt., Dr. Marshall. Access—Wemyss Bay, ½ hour's sail.

Shandon. — *Shandon Hydropathic.* Consulting Phys., Dr. Wm. R. Sewell. Access—Shandon station, 5 mins.

Skelmorlie. — *Wemyss Bay Hydropathic.* Med. Supt., Dr. W. C. Philp. Access—Wemyss Bay station, ½ mile.
See also p. 922

Southport (Birkdale Park).—*Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations.
See also p. 920

Kenworthy's Hydropathic, 51, Bath Street. Phys., Dr. Kenworthy. Access—Chapel Street (L. & Y.), Lord St. (Cheshire Lines) ¼ mile.

Tunbridge Wells.—*The Spa Hotel.* Access—Station, about 1 mile; London, 34 miles. Apply, Manager.
See also p. 918

Ulverston.—*Conishead Priory Hydropathic.* Med. Supt., Dr. Ashburner. Access—Ulverston station, 1¾ mls.

NURSING INSTITUTIONS AND PRIVATE HOMES FOR INVALIDS.

NURSING INSTITUTIONS.

Bournemouth.—*Victoria Nurses' Institute,* Cambridge Road. Matron, C. Forrest. Access—Bournemouth West stat.
See also p. 906

Bristol.—*General Hospital.* Matron, Miss A. Densham. Sec., Wm. Thwaites.
See also p. 896

Cheltenham. — *General Hospital* Private Nursing Staff. Matron Miss G. Möller.
See also p. 900

Leamington.—*Private Nursing Association,* Radford Road. Apply, Matron.
See also p. 901

Leeds.—*Trained Nurses' Institution,* 21, Hyde Terrace. For Trained Nurses and Masseuses. Apply Superintendent.
See also p. 896

London. — *Blackheath Nursing Institution,* 9, Montpelier Row, Blackheath, S.E. Lady Principal Miss Duncan.
See also p. 902

National Hospital Male Nurses' Association, Queen Square, W.C. Apply to Lady Superintendent. Tel. No. 4594 Central.
See also p. 883

St. Luke's Hospital, Old Street, E.C. Trained Nurses for Mental, Nervous and Massage Cases. Apply Matron.
See also p. 896

Temperance Male Nurses' Co-operation, Ltd., 43, New Cavendish Street, W.; also at Manchester and Glasgow. Secretary, M. D. Gold.
See also p. xvii

Sunderland. — *Nursing Inst. and Home for Trained Nurses.* Matron, Miss C. Aldis.

Thoroughly reliable Nurses supplied for Medical, Surgical, Mental, and Maternity cases.

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only).
See also p. 942

PRIVATE HOMES FOR INVALIDS.

Bath.—*Lansdown Hospital and Nursing Home*, Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Med. Supts., Dr. Percy Wilde, and Dr. Wells-Beville. Access—M.R. or G.W.R. station, Bath, about 1 mile
See atso p. 902

Alderley Edge (Cheshire). — *The David Lewis Colony* (for Sane Epileptics). Director, Alan McDougall, M.D., Warford, near Alderley Edge. *See also p.* 898

Billericay (Essex).—*New Lodge* (for gentlemen suffering from slight mental defect), Conducted by the Co-operative Sanatoria, Ltd.
See also p. 947

Bournemouth.—*Oakholme*, Undercliff Road, Boscombe (for paying patients). Apply, Mrs. Hill.
See also p. 907

St. Luke's Homes for Epileptic Churchwomen, 36, Parkwood Rd.; also at Swanmore, Ryde, I.W. Med. Supts., Dr. Hosker, Boscombe; A. Banks, F.R.C.S., Ryde.
See also p. 898

Victoria Nursing Institute and Home, Cambridge Road (for paying patients). Apply the Matron.
See also p. 906

Chalfont St. Peter (Bucks).—*Braeside*, Chilternwood. Epileptics, nervous cases, and mentally deficient. Apply Miss Crighton. *See also p.* 898

Chorley Wood (Herts.).—*The Laburnums*, Heronsgate. Private Home for epileptic, paralytic, and other cases. Apply, Miss King. Access—Chorley Wood station, 1½ miles.
See also p. 898

Erdington. — *Homes for Paying Patients*, Penns Lane. Rest Cure, Massage, etc. Apply, Miss C. L. Fallows. *See also p.* 899

Eversley (Hants).—*Glencote* (Sanatorium for Non-tubercular cases). Res. Med. Supt., J. G. Garson, M.D. Access—Wellington College station, 4½ miles; Fleet, 6 miles.
See also p. 932

Gerrard's Cross (Bucks).—*Oakhain*, North Park. Nursing and Convalescent Home. Principal, Mrs. M. J. Waring. *See also p.* 903

Hadlow Down, Buxted (Sussex).—*South Beacon* (for the care and treatment of gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harmer. Access—Buxted, 3 miles; Mayfield, 4 miles; Heathfield 4 miles.
See also p. 898

Haslemere, Surrey.—*Haslemere Nursing Home, "Courtsfold."* Medical, Weir-Mitchell, Rest Cure, and Chronic cases received. Apply to the Misses Ringwood and Inge. Tel. No. 22. *See also p.* 900

Jedburgh.—*Abbey Green.* Res. Prop., Wm. Blair, M.D. Access—N.B.R., Jedburgh. Tel. No. 3. *See also p.* 905

London.—*Manna Mead*, 17, The Grove, Blackheath, S.E. (for invalids and convalescents). Principals, Mrs. Knight and Miss Tapley Spurr. Access—Lewisham Junction, 15 mins. walk. *See also p.* 903

London.—*St. Thomas's Home*, St. Thomas's Hospital, Westminster Bridge. Apply, Sydney Phillips, B.A., St. Thomas's Hospital, S.E. Access — Waterloo, 5 minutes. Tel.: Hop. 1637. *See also p.* 901

Minehead (Som.). — *Blair Lodge.* Private Medical, Surgical, and Mental Home. Medical supervision (non-resident). Apply to Sisters Heather. Access-Station, 10 mins.
See also p. 902

Reigate Hill (Surrey).—*The Beeches, Wray Lane.* Nerves, Rest Cure, Massage, Electricity, Diet. Apply, Miss Goslett. *See also p.* 901

Ryde (Isle of Wight). — *Crescent House* (for treatment of paralysis, neurasthenia, osteo-arthritis and neuralgia. Apply, Dr. G. M. Lowe.
See also p. 900

Stanmore (Middlesex).—SCARLET FEVER *Convalescent Home* (*The Mary Wardell*). Vis. Phys., A. Muir, M.D. Hon. Sec., Miss M. Wardell. Access — Stanmore, 2 miles. *See also p.* 901

Tunbridge Wells.—*Mount Ephraim Nursing Home*, 8, Molyneux Park. Medical, Surgical, Weir Mitchell, and Massage cases. Apply Miss Baxter. *See also p.* 905

PRINCIPAL BRITISH SPAS,

With Indications for their Therapeutical Employment.

Bath (Somerset).—Sheltered from the N. and N.E. winds by a range of hills from 600 to 800 feet high; 2 hours from London (Paddington), 12 miles from Bristol. Average rainfall 30·79 inches. Climate mild and equable.

Waters.—The only hot springs in Great Britain. Three springs yield over half-a-million gallons of water daily, the temperature of the hottest being 120° F. The waters contain sulphates of calcium, strontium, sodium, and potassium, with calcium carbonate, the chlorides of magnesium, sodium, and lithium, etc. They are strongly radio-active, and the rare gases, krypton and xenon, have recently been discovered in the waters.

Therapeutic indications.—Gout, chronic rheumatism, rheumatoid arthritis, sciatica, disorders of the digestive organs, anæmia, skin diseases, nervous disorders and debility.

Baths.—Modern baths of every description, including Aix massage douche, deep baths, electric, water and hot air, natural vapour, needle, intestinal douches for muco-membranous colitis and similar conditions, sulphur, Nauheim, and Zander medico-mechanical treatment.

Nursing and Baths.—Lansdown Grove House (*See p.* 902).

Hotel.—Westbourne Private Hotel (*See p.* 908).

Boarding House.—Mrs. Lawrence's Private Boarding House (*See p.* 909).

Bridge of Allan (Stirlingshire).—Three miles north of Stirling. Charming and picturesque situation. Key to the Scottish Highlands. Sheltered from the North and East winds by the Ochil Hills. On the direct route to London, and within an hour's rail journey of Edinburgh and Glasgow. Climate mild and equable all the year.

Waters.—Natural mineral waters from six springs at a depth of about 116 feet, exceedingly rich in saline, the chief ingredients being various salts of calcium, sodium, and magnesium. These waters are once more coming into great prominence.

Therapeutic Indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, and in rheumatism, gout, sciatica, and other nerve affections, also diseases of the skin.

Baths.—Excellent suite of baths, with skilled attendants.

Hydropathic Establishment.—Bridge of Allan Hydro. (*See p.* 918).

Buxton (Derbyshire).—1000 feet above sea level, 3½ hours from London (St. Pancras), 23 miles from Manchester, 30 from Sheffield, 53 from Liverpool. Bracing climate. Lowest absolute humidity of any health resort in Great Britain.

Waters.—Thermal springs 82° F. Powerful radio-active properties. More highly charged with nitrogen gas than any other spring. Chalybeate spring.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, nervous diseases, skin diseases, especially those of gouty origin, malaria and other tropical diseases, colitis, anæmia, phlebitis, and diseases of women.

Baths. — Recently extended. Douche-immersion, vapour, douche-massage. Complete electrical department. Moor baths. Plombières douches. Chalybeate baths, and carbonic acid gas baths.

Hydropathic Establishments.—Buxton Hydro. (*See p.* 921); and Haddon Hall Hydro. (*See p.* 920).

Cheltenham (Gloucestershire).—250 feet above sea level, 3 hours from London. Rainfall about 27 inches. Protected from N. and N.E. winds.

Waters.—The mineral waters are of two kinds. One is alkaline from contained soda carbonate, the other is impregnated with the sulphates of soda and magnesia. They are now receiving considerable attention from the medical profession, and seem likely to successfully compete with

Carlsbad and Marienbad in attracting a portion of the patients formerly sent abroad.

Therapeutic indications.—Gout, dyspepsia, dietetic disorders generally, neurasthenia, and other conditions.

Baths.—Good modern baths, with massage.

Church Stretton (Salop).—613 feet above sea level, in the "Highlands of England," 4¼ hours from Euston, 3¾ hours from Paddington, 1½ hours from Birmingham, 2½ hours from Liverpool and Manchester, and 2½ hours from Bristol. Air noted for its extreme purity, bracing, with a somewhat tranquillizing influence, and a generally invigorating climate. Hills 1,250 to 1,700 feet high. Prevailing wind, S.W. Rainfall, 32 inches. Modern drainage. Porous soil. Death-rate in 1909, 7 per 1,000.

Waters.—Said to be the purest in England; useful in gout, rheumatism. chronic renal affections, and arteriosclerosis.

Therapeutic indications.—Specially the "open-air" cure of neurasthenia, for sequelæ of influenza, insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from overwork and convalescence after illness or operation. A good 'after-cure' resort from Bath, Buxton, Cheltenham, Droitwich, Leamington, and Llandrindod Wells.

Droitwich (Worcestershire.)—150 feet above sea level, 2½ hours from London (Paddington), 19 miles from Birmingham, 6 from Worcester. Rainfall 23 inches. Mean winter temperature 47° F., summer 69·9° F. Well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. The brine is pumped from 200 feet below the ground level. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (channel), containing in every gallon 20,000 grains of saline in excess of any known waters: the waters possess radio-active properties.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar to Nauheim treatment,—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, skin diseases of a dry, scaly nature, e.g., chronic eczema and psoriasis.

Baths.—Immersion, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, etc.

Hotel.—Worcestershire Brine Baths Hotel, and Brine Baths (*See p.* 912).

Harrogate (Yorkshire).—450 feet above sea level, 4 hours from London, 17 miles from Leeds, 20 from York. The climate is stimulating and fairly dry—bracing moorland air.

Waters.—Celebrated for the medicinal properties of its 80 springs—sulphurous, chalybeate, saline, etc.

Therapeutic indications.—Anæmia, chlorosis, gout, rheumatism, disorders of liver and stomach, muco-membranous colitis, chronic appendicitis, and skin diseases.

Baths.—There are four establishments, where numerous treatments are given, including sulphur baths, douche, Nauheim, vapour, Russian, Turkish, electric, mineral, electric light, ozone, etc.

Hydropathic Establishment.—The Cairn Hydropathic (*See p.* 911).

Ilkley (Yorkshire).—Situated on the southern slope of the valley of the Wharfe, rising rapidly from the bank of the river to a height of 1320 feet above sea level; distant 16 miles from Leeds, 14 from Bradford, and 18 from Harrogate. Occupying a sheltered position. The annual rainfall, 35 inches, is considerably less than on the other side of the river, with fewer rainy days. Mean annual temperature 48° F. Death-rate 8 per 1000. Being in close proximity to extensive moors the air is bracing and

Ilkley, *continued.*

exhilarating and at the same time dry and soft, having a wonderfully restorative effect upon invalids such as Anglo-Indians and delicate children, and convalescents.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydro-therapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Leamington Spa (Warwickshire).—170 feet above sea level, 1 hour 50 minutes from London (Paddington or Euston), 24 miles from Birmingham. Equable and mild climate.

Waters.—Saline—chalybeate. Resembling those of Homburg, but are more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylopoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension and chronic interstitial nephritis.

Baths.—Turkish, medicated, swimming, and electric of all kinds.

Nursing Institution.—Private Nursing Association (*See p.* 901).

Llandrindod Wells (Radnorshire). — Situated in Central Wales, at an altitude of 750 feet. About 5 hours from London on the L. & N.W. Ry. It lies in the centre of a plateau of hills rising in places to over 2000 feet. Sheltered from the east, and open to the south and west. The soil is porous, and dries up quickly after rain. The climate is extremely bracing.

Waters.—There is a great variety of mineral waters—saline, sulphurous, iron, magnesium, chloride of calcium, and lithia springs similar in composition to those at Kissengen and Homburg. Slightly aperient and strongly diuretic.

Therapeutic indications.—The diseases most benefited are those in which any digestive derangements are present, the various forms of gout and rheumatism, rheumatoid arthritis, neuritis and fibrositis, gall-stones and biliary stasis, renal calculus, or any kidney or bladder condition requiring diuresis, neurasthenia, or debility from over-work or convalescence. (*See also p.* 916.)

Llangammarch Wells (Breconshire).—In an open valley surrounded by moorland, 600 feet above sea level. On the L. and N.W.Ry., 5¾ hours from London, 4 from Manchester, 4¼ from Liverpool. Mean annual temperature 47·5° F., summer 55·4° F. Well protected from the east.

Water.—Saline, containing the chlorides of barium, calcium, magnesium, lithium, and sodium ; the only one of its kind in the British Isles. The barium salt has a physiological action on cardiac muscle similar to that of digitalis and strophanthus, and is also a good diuretic. Administered both internally and externally. Temperature 56° F. ; is heated for bathing purposes. A modified Nauheim system of baths, exercises, massage, and hill climbing is carried out.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves' disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Baths.—Immersion, douche, and needle.

Malvern (Worcestershire).—Situated at a mean altitude of 500 ft. above sea level, on eastern slope of Malvern Hills (9 miles long and rising to 1400 ft.), 2¾ hours from London (Paddington), and about 1 hour from Birmingham. Original home of hydropathy. Soil gravelly (syenitic

detritus). Air dry and bracing, cool in summer and warm in winter. Average rainfall 22·12 inches. Mean annual temperature 49·58, with low daily variation. Lowest death rate of any inland watering place. Sanitation perfect.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon.

Therapeutic Indications. — Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial, nephritic and cutaneous diseases.

Baths.—Natural pure brine, Turkish and electric baths, Vichy massage and Aix douches, Fango-di-Battaglia.

Hydropathic Establishment.—Dr. Fergusson's Hydropathic (*See p.* 916).

Hotels.—Abbey Hotel (*See p.* 917), Grosvenor Hotel (*See p.* 916).

Matlock Bath (Derbyshire).—300 to 800 ft. above sea level, 3½ hours from London (St. Pancras), 46 miles from Manchester, 16 from Derby. Rainfall 29 inches. One of the most sheltered towns in England.

Waters.—Thermal Springs. Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate. Owing to its peculiarly soft and unctuous character it is especially valuable in bathing and douche operations, particularly those associated with massage, such as those known as the "Aix" and "Vichy" douches.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia, cardiac asthenia, chronic diseases of the liver or kidneys, and digestive and bilious disorders.

Baths, etc.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Fango-di-Battaglia.—The volcanic mineral deposit from the hot springs near Padua (N. Italy) is imported, and extensively used in the treatment of gout, rheumatoid arthritis, and neuritis.

Matlock Bank (*Matlock* station, one mile by rail from Matlock Bath).—300 to 800 feet above sea level, 3½ hours from London (St. Pancras), 45 miles from Manchester, 17 from Derby. South-westerly aspect, and well sheltered from the north. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal Hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant light and heat, Schnee four-cell, X rays, etc. They also include Turkish, Russian, plunge, medicated and inhalation baths, Aix and Vichy douches etc.

A feature of the Matlock Hydros is, that as a rule they are complete in their own grounds, and contain croquet and tennis lawns, and bowling and putting greens, which, as a means of recreation and exercise, form a valuable auxiliary to a course of hydropathic treatment.

Hydropathic Establishments.—Rockside Hydropathic (*See p.* 914) and Smedley's Hydropathic (*See p.* 913).

Peebles (Peebleshire, N.B.).—500 ft. above sea level. One hour from Edinburgh and 8 from London (via Galashiels). Rainfall 27 inches. Bracing climate but sheltered from the north winds. Mean annual mortality rate 11 per mil. Population 6000 in winter, and 10,000 in summer.

Waters.—The waters are of the halothermal type, similar to Kissengen and Kreuznach. The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well.

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Lancy treatment of cardiac disease, and in this respect seem likely to compete with the above mentioned continental resorts, patients

Peebles, *continued.*

being saved the long journey, and also, after the baths, are conveyed by lift immediately to their rooms for resting. The waters are also suited to dyspepsia, gout, rheumatism and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango di Battaglia).

Hydropathic Establishment.—Peebles Hotel Hydropathic (*See p.* 915).

Ripon (Yorkshire).—Situated on rising ground near the junction of the Rivers Ure and Skell. On the N.E. Railway, 4¾ hours from London. 120 feet above sea level. Climate mild but bracing. Soil, gravel and sand, and dries up quickly after rain. Prevailing winds, W. and S.W. Surrounding country well wooded and very beautiful, Fountains Abbey and many other places of interest being within easy reach. The Yorkshire Moors are only a few miles from the City.

Waters.—Saline Sulphur Water brought down from Aldfield Spa, 4 miles distant to the New Baths erected in 1904.

Therapeutic indications.—Chronic and subacute gout and rheumatism, rheumatoid arthritis, skin diseases (eczema, psoriasis, acne, etc.), catarrhs, gastric and liver derangements.

Hotel.—Ripon Spa Hotel (*See p.* 910).

Strathpeffer Spa (Ross-shire).—In the Highlands of Scotland. 180 to 300 feet above sea level. Through carriages twice a week during summer from London, 15 hours, and per the Highland Railway (*see p.* 918). Sheltered from N. and N.E. winds. Prevailing wind S.W. Sandy soil. Bracing air.

Waters.—Sulphurous and chalybeate. Former, very rich in sulphuretted hydrogen gas and sulphates. Four sulphur wells in use: (1) Old well; (2) Upper; (3) Strong; (4) Cromartie. No. 4 contains over 19 cubic inches H_2S to gallon. Sulphates the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic and subacute gout and rheumatism (especially articular), rheumatoid arthritis, chronic skin diseases (eczema, acne, psoriasis, etc.), especially when gouty or rheumatic, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, neurasthenia, anæmia, obesity, chronic metallic poisoning, dilatation of heart, neuritis.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, radiant heat (electric), and high-frequency current.

Hotel.—The Ben Wyvis Hotel (*See p.* 919).

Tunbridge Wells (Kent).—400 feet above sea level, 1 hour from London, 30 miles from Hastings, Brighton, and Eastbourne. Rainfall 30 inches. Mean winter temperature 41·3° F., summer 55·9° F. Lies upon a bed of sandstone. Climate is mildly tonic and invigorating. Prevailing winds W. and S.W.

Waters.—Chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—Diseases of respiratory organs (bronchitis, asthma, and phthisis), early cardiac cases, diseases of digestive organs, gout and rheumatoid arthritis, and especially diseases of nervous system (neurasthenia and mental depression), as well as in convalescence and infantile disorders. Waters indicated in anæmia, chlorosis, and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour and swimming, medicated and electric light. (*See p.* 918).

Nursing.—Mount Ephraim Nursing Home (*See p.* 905).

Hotel.—The Spa Hotel (*See p.* 918).

Woodhall Spa (Lincolnshire).—Built upon ironstone sand, through which the surface water percolates very rapidly. Midway between Boston and Lincoln, about 3 hours from London (King's Cross). Rainfall 22·66 inches. Air bracing, clear, and uncontaminated, from the moors and pine woods. Excellent water supply.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Chronic articular and muscular rheumatism, gout, sciatica, and lumbago; neuritis, skin diseases, tuberculous diseases, gall-stones, and liver derangements, and diseases peculiar to women.

Baths.—Complete and recently enlarged immersion, shower, lave, and local douches; inhalation, respiration, natural vapour, Russian and Berthollet vapour; Dowsing radiant heat, and light treatment. Nauheim, Aix and Vichy massage douche, electric, X rays, and Ionic treatment.

Hotel.—Victoria Hotel (*See p.* 922).

Helouan, Egypt.—Sixteen miles from Cairo by train, 200 feet above the Nile, which is about three miles from the town. Celebrated for its wonderfully dry and warm yet bracing climate, the amount of sunshine in the Winter months, and its convenient position for seeing many of the antiquities of Egypt. The amount of bright sunshine from November to March averages 8·3 hours a day as against 1·4 in London. The diurnal variations are small, the air is fresh by day and night and very free from dust. The average annual rainfall is about $\frac{3}{4}$ of an inch.

Waters.—Strong sulphur waters, which are used internally and externally in various ways, but especially in the Helouan Bath, in which massage is given while a stream of water at the desired temperature passes freely through the bath. This water rises at a temperature of 91° F.

Therapeutic Indications.—Gout, rheumatism, the various forms of arthritis, fibrositis and neuritis, neurasthenia, chronic nephritis, and generally for those requiring a dry, warm climate, not relaxing, for the winter months.

Fully equipped Zander Institute including electrical treatment and baths.

Hotel.—The Al Hayat Hotel (*See p.* 923).

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(1) The Vaccination Stations enumerated in the subjoined list are open, under certain specified conditions, for the purposes of Teaching and Examination;

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	St. Thomas's Hospital		
	Tolmers Square Institute, Drummond St., N.W.	*J. Loane, M.R.C.P.*, 13, Great Alie Street, E.	Monday, Wed.; 1
	Eastern Disp., Leman St.		Wednesday; 11
	Christ Church Mission Hall, Shroton St., Marylebone	E. C. Greenwood, L.R.C.P., 19, St. John's Wood Park, N.W.	Friday; 3
	St. Olave's and St. John's Institute, Tooley St., S.E.	V. A. Jaynes, M.R.C.S., .. 157, Jamaica Road, Bermondsey, S.E.	Wednesday; 3
	Royal Free Hospital, Gray's Inn Road, W.C.	Mrs. F. E. Willey, M.D., 1a, Devonshire Street, W.	*
Birmingham ..	144, Hockley Hill	W. H. Line, M.D., ... 144, Hockley Hill	*
Bristol ..	St. Peter's Hospital, Bristol	*G. S. Page, L.R.C.P.*, .. 78, Old Market Street	Wednesday; 11
Cambridge ..	Addenbrooke's Hospital ..	Dr. F. Deighton, ... Hills Road	*
Leeds ..	Leeds General Infirmary ..	Dr. A. T. Bacon, .. Westfield, Hyde Park Rd.	*
Liverpool ..	17, Mulgrave Street	*Dr. N. E. Roberts*, .. 17, Mulgrave Street	Tuesday; 3
Manchester ..	St. Mary's Hosp., Whitworth Street West, Manchester	John Scott, M.D., .. 249, Upper Brook Street	*
Newcastle ..	The Dispensary, Nelson St.	*F. Hawthorn, M.D.*, . 6, Regent Terrace	Wednesday; 3
Sheffield ..	Jessop Hospital for Women	Dr. P. E. Barber. .. .. 3, Clarkehouse Road	*
Aberdeen ..	The Public Dispensary ..	Dr. T. Fraser, .. . 51, Elmbank Terrace	Wednesday; 2.30
Dundee ..	Royal Infirmary	R. C. Buist, M.D., ... 166, Nethergate	Monday; 2
Edinburgh ..	New Town Dispensary	*J. B. Buist, M.D.*, 1, Clifton Terrace	Friday; 11
	Marshall Street Dispensary		Thursday; 11
	Livingstone Dispensary, 39, Cowgate		Tuesday; 3
	St. Cuthbert's Hall, Riego Street, Tolcross		Thursday; 3
	The Royal Public Dispensary	W. G. A. Robertson, M.D., 26, Minto Street	Wed. & Sat.; 12
Glasgow ..	The Royal Infirmary	Dr. H. H. Borland, 41, Circus Drive, Dennistown	Monday; 12 (Women) Thursday; 12 (Men)
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*(a.) Candidates for Certificates should communicate with the authorized Teacher to learn the dates of his or her regular courses of instruction. * Days and hours arranged each Session.*

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Weiss, John & Son, Lim., 287, Oxford Street, W.
Woodfield, W. & Sons, Redditch
Woolley, Jas. Sons & Co., Lim., Victoria Bridge, Manchester
Young, Archibald & Son, 57-61, Forrest Road, Edinburgh

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Hicks, J. J., 8–10, Hatton Garden, E.C.
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Arents, E. (Dr. Doucet's), 48, Surrey Square, Old Kent Road, S.E.
Association for the Supply of pure Vaccine Lymph, 14a, Great Marlborough Street, W.
Ferris & Co., Lim., Bristol
Jenner Institute for Calf Lymph, 73, Church Road, Battersea, S.W.
Renner's (Dr.) Establishment, 75 Upper Gloucester Place, N.W.
Roberts & Co. (Dr. Chaumier's), 76, New Bond Street, W.

NOTE BOOK.

It is easier to make a note of a thing than to remember *where* the note was made. The following pages are indexed under their respective headings, and any note can be immediately found when required.

NOTES.

Copy here any formula or fact you wish to keep for reference. (These pages are indexed under the word "Notes.")

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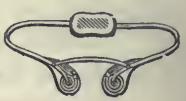

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NOTES

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NOTES.

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NOTES.

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SEE PAGE LXII.

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	60			70			60			70		
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INDEX TO LIFE ASSURANCE OFFICES

A *when Established*; B, C, D, *Annual Premiums to Insure £100 on death, with Profits, at the age of* 30, 40, *and* 50; E, *Assurance and Annuity Funds, exclusive of Paid-up Capital.* M, *Mutual Offices*; P, *Proprietary Offices.*

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Title, Etc., of Office.	A	B	C	D	E
					£
Abstainers and General, Life, Fire, etc., Edmund St., Birmingham. *Act. & Sec.*, R. A. Craig A.I.A. .. .. P	1883	40/11	55/10	82/3	514,222
Alliance, Fire, Life, Marine, Accident, and Annuities, Bartholomew Lane, E.C. *Gen. Man.*, Robert Lewis .. P	1824	48/9	64/5	90/9	6,126,033
Atlas, Fire, Life, and Accident, 92, Cheapside, E.C. *Act.*, Robert Cross. *Gen. Man.*, Saml. J. Pipkin .. .. .. P	1808	49/3	63/7	88/8	2,049,423
Australian Mutual Provident Society, Life, Endowments & Annuities, 37, Threadneedle St., E.C. *Res. Sec.*, H. W. Apperly. Further particulars see page 830 M	1849	48/2	64/5	89/10	25,648,008
Britannic Assurance Co., Ltd., Life Endowments & House Purchase, Broad Street Corner, Birmingham. *Chairman*, F. T. Jefferson, J.P. *Sec.*, J. A. Jefferson, F.I.A. Further particulars see page 832 P	1866	48/6	65/2	94/-	2,500,000
British Equitable, Life, Fire, Accident, Burglary, Employers' Liability 1, 2, 3, Queen St. Place, E.C. *Man.*, Basil May, F.I.A. P	1854	48/8	64/11	91/9	*1,758,362
Caledonian, Fire, Life, Personal Accident and All Illness, Employers' Liability, Burglary, 19, George Street, Edinburgh. *Gen. Man.*, Robert Chapman. London Offices, 82, King William Street, E.C., and 14, Waterloo Place, S.W. .. .. .. P	1805	48/9	64/6	88/6	2,747,467
City of Glasgow, Life, 30, Renfield Street, Glasgow. *Gen. Man.*, William S. Nicol. London Office, 12, King William St., E.C. *London Man.*, J. D. Milne .. P	1838	48/9	64/6	89/10	3,055,122
City Life Assurance Company, Ltd., 6, Paul Street, Finsbury, E.C., Life Assurance and House Purchase. *Man. Director*, M. Gregory. Further particulars see page 833	1897	49/1	66/2	94/7	*350,000
Clergy Mutual, Life, 2 & 3, Sanctuary, Westminster. *Act. & Man.*, F. B. Wyatt. *Sec.*, W. N. Neale. Further particulars see page 831 .. .. M	1829	46/4	62/2	87/4	4,559,951
Clerical, Medical and General, Life, 15, St. James's Square, and 1, King William Street, E.C. *Act. & Sec.*, A. D. Besant P	1824	48/7	66/9	96/3	5,188,761
Colonial Mutual, Life, Personal Sickness and Accident, and Annuity, 33, Poultry. *Man.*, Arthur E. Gibbs .. .. M	1873	47/4	63/2	89/9	3,111,657
Commercial Union, Fire, Life, Marine and Accident, 24, 25, and 26, Cornhill, E.C. *Act.*, H. C. Thiselton .. .. P	1861	47/10	65/2	92/4	3,949,033
Co-operative, Life, Accident, Fidelity, and Fire, Corporation Street, Manchester. *Sec.*, James Odgers. Further particulars see page 833 .. .. .. P	1867	45/8	61/5	88/4	274,448
Eagle, Life, 79, Pall Mall, S.W. *Gen. Man.* Geo. R. Jellicoe; *Sec.*, J. F. E. Hall P	1807	48/7	64/5	89/10	2,270,500
Economic, Life, 6, New Bridge Street, Blackfriars. *Act. & Sec.*, G. Todd, M.A., F.I.A. M	1823	44/4	59/6	85/5	4,432,733
Edinburgh, Life, Endowments, and Annuities, 26, George Street, Edinburgh. *Man. & Act.*, A. Hewat, F.F.A., F.I.A. *Sec.*, T. M. Gardiner. London, 3, Birchin Lane, E.C. *Sec.*, J. J. Bisgood .. P	1823	47/11	64/2	90/2	4,252,840

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Title, Etc., of Office.	A	B	C	D	E
					£
English and Scottish Law, Life, Annuity, Endowment, and Loan, 12, Waterloo Place, S.W. *Gen. Man.*, Albert G. Scott. *Act. & Sec.*, John Spencer, F.I.A. .. .. P	1839	47/1	62/8	87/9	2,943,851
Equitable Life Assurance Society, Mansion House St., E.C. *Act. & Sec.*, G. J. Lidstone M	1762	53/5	67/11	90/7	5,043,732
Equity and Law, Life, 18, Lincoln's Inn Fields, W.C. *Act. & Sec*, W. P. Phelps, M.A., F.I.A... .. .. P	1844	48/10	64/6	90/9	4,641,253
Friends' Provident, Life, Annuities, etc., Bradford, Yorkshire. *Sec.*, William H. Gregory. *Act.*, Alfd. Moorhouse, F.I.A. M	1832	48/-	64/-	89/7	3,358,056
General Accident Fire and Life Assurance Corporation, Ltd., Perth, Scotland. *Gen. Man.*, F. Norie-Miller, J.P. Further particulars see page 834 .. P	1885	49/2	64/11	91/3	48,153
General, Life, 103, Cannon Street, E.C. *Man. & Sec.*, John Robert Freeman. Further particulars see page 832 P	1837	49/10	65/4	92/8	1,977.263
Gresham, Life, St. Mildred's House, E.C. *Gen. Man.*, James H. Scott .. P	1848	48/2	64/1	91/5	10,079,575
Guardian, Fire, Life, Accident, Burglary, Fidelity Guarantee, and Plate Glass, 11, Lombard Street, E.C., & 21, Fleet St. *Sec.*, T. G. C. Browne. *Act.*, Ernest Woods P	1821	48/10	64/6	89/3	4,110,857
Law Union and Rock, Life, Fire, Accident, Annuities, Burglary, etc., 126, Chancery Lane. *Gen. Man.*, Alex. Mackay P	1806	48/4	64/-	89/10	7,386,855
Legal and General, Life, and Annuities, 10, Fleet Street, E.C. *Act. & Man.*, E. Colquhoun .. .. .. P	1836	50/9	65/11	90/9	*5,903,633
Life Association of Scotland, 82, Princes St., Edinburgh. *Man.*, Gordon Douglas. *Sec.* R. M. M. Roddick. London Office, 18, Bishopsgate Street Within, E.C. *Sec.*, J. C. Wardrop .. .. .. P	1838	48/11	64/10	91/1	*5,735,517
Liverpool and London and Globe, Fire, Life, Annuities, Accident, etc., 1, Dale St., Liverpool. *Gen. Man. & Sec.*, A. G. Dent. London Office, 1, Cornhill, E.C. P	1836	49/10	65/9	91/3	*5,199,888
London and Lancashire, Life and General, 66 & 67, Cornhill, E.C. *Gen. Man. & Sec.*, W. Æneas Mackay. *Jnt. Asst. Secs.*, E. E. Dent and L. C. Kestin. *Act.*, Harold Dougharty, A.I.A., F.C.I.S. .. P	1862	46/10	62/4	86/10	2 500,388
London Assurance Corporation, Fire, Life, Marine, and Accident, 7, Royal Exchange. *Man.* of Life Dept., James Clunes. *Act.*, A. G. Hemming .. .. P	1720	49/6	64/11	91/5	2,448,740
London Life Association, Lim., 81, King William Street, E.C. *Act. & Man.*, C. D. Higham, F.I.A. .. .. M	1806	60/-	79/-	108/-	5,031,614
Marine and General Mutual, Life, and Marine, 14, Leadenhall Street, E.C. *Act. & Sec.*, S. Day, F.I.A. .. .. M	1852	48/10	65/-	91/6	1,684,255
Metropolitan Life, 13, Moorgate St., E.C. *Sec.*, Bernard Woods. *Act.*, H. J. Baker M	1835	49/9	66/4	92/-	2,253,158
Mutual Life and Citizens', 17, Coleman Street, E.C. *Man.*, Jas. Graham, F.I.A., F.F.A. P	1886	48/9	65/3	89/9	4,769,157
Mutual Life Insurance Co. of New York, 16, 17 and 18, Cornhill, E.C. *Gen. Man.*, J. H. Harrison Hogge. *Sec.*, T. Crawford M	1843	48/9	66/-	97/-	113,634,666
National Mutual Life, 39, King Street, Cheapside. *Act. & Man.*, Geoffrey Marks, F.I.A. *Sec.*, H. J. Lockwood. *Asst. Act.*, C. R. V. Coutts, F.I.A. M	1830	48/4	63/7	89/6	2,874,162
National Mutual Life Association of Australasia, Ltd., 5, Cheapside, E.C. *Man.*, John B. Gillison, F.I.A., F.F.A. Further particulars see page 833 M	1869	46/8	61/6	87/2	6,000,000

A, *when Established;* B, C, D, *Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50;* E, *Assurance and Annuity Funds, exclusive of Paid-up Capital.* M, *Mutual Offices;* P, *Proprietary Offices.*

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Title, Etc., of Office.	A	B	C	D	E
					£
National Provident, 48, Gracechurch Street, E.C. *Act. & Sec.*, L. F. Hovil. M	1835	50/2	66/3	91/1	6,688,106
New York Life, Trafalgar Buildings, Trafalgar Square, London, W.C. *Sec.*, Wm. R. Collinson, F.C.I.S. .. .. .. M	1845	48/9	66/–	96/11	123,231,950
North British and Mercantile, Fire, Life, Annuities, Marine, Burglary, Accidents, &c., 61, Threadneedle St., E.C., and 64, Princes St., Edinburgh. *Life Man. & Act.*, London, H. Cockburn. *Home Fire & Jt. Life Man.*, D. C. Haldeman. *Sec.*, R. Carmichael. Further particulars see page 829 P	1809	49/10	66/1	91/11	*14,637,607
Northern Assurance, 1, Moorgate St., E.C. *Gen. Man.*, H. E. Wilson .. P	1836	49/–	64/8	90/10	4,968,582
Norwich Union, Life, Norwich. *Gen. Man. & Act.*, Davidson Walker. London Office, 50, Fleet Street, E.C.	1808	45/8	59/6	85/3	9,793,521
Pearl, Life, London Bridge, City, E.C. *Jnt. Man'g Directors*, F. D. Bowles, Esq., J.P., C.C. G. Shrubsall, J.P. .. P	1864	49/–	65/–	92/–	4,567,877
Phœnix Assurance, 19 & 70, Lombard St., 57, Charing Cross, and 187, Fleet Street, E.C. *Gen. Man.*, G. H. Ryan, F.I.A. P	1782	48/11	64/7	90/8	9,985,596
Provident Clerks & General Mutual Life Assurance Association, 27 & 29, Moorgate St., E.C. *Sec.*, John E. Gwyer M	1840	46/4	62/8	92/2	2,570,000
Prudential (Ordinary), Life, Holborn Bars. *Jnt. Secs.*, D. W. Stable and J. Smart. Further particulars see page 830 P	1848	49/6	65/11	91/11	40,559,622
Refuge, Life, Oxford St., Manchester. *Joint Mans.*, R. Wm. Green & Philip Smith. London Office, 133, Strand, W.C. P	1864	49/3	65/9	91/9	6,538,618
Royal Exchange Assurance, Fire, Life, Annuities, etc., Royal Exchange, and 44, Pall Mall. *Act.*, H. E. Nightingale, F.I.A. P	1720	49/–	64/9	90/2	3,849,294
Royal, Fire, Life, Annuities, and Accident, Royal Insurance Buildings, Liverpool. *Man.*, Chas. Alcock. London Offices, Lombard Street. *Sec.*, R. M'Connell P	1845	49/9	64/1	88/3	10,124,279
Sceptre, Life and Endowments, 40, Finsbury Pavement, E.C. *Sec.*, W. E. Wright P	1864	48/8	64/8	90/6	1,155,373
Scottish Amicable, Life, St. Vincent Place, Glasgow. *Man.*, W. Hutton. *Sec.*, C. Guthrie .. .. .. M	1826	51/9	66/3	90/1	5,358,369
Scottish Equitable, Life, 28, St. Andrew Square, Edinburgh. *Man. & Act.*, G. M. Low. *Sec.*, J. J. McLauchlan. London Office, 19, King William St., E.C. *Sec.*, F. R. Leftwich .. .. M	1831	50/–	65/5	90/6	5,725,700
Scottish Life, Life, Accident and Annuities, 19, St. Andrew Square, Edinburgh. *Man.*, Sir David Paulin, F.R.S.E. London Office, 13, Clements Lane, E.C. *Sec.*, George Struthers .. .. .. P	1881	49/5	64/6	90/5	1,472,895
Scottish Metropolitan, Life, Accident and Annuities, 25, St. Andrew Square, Edinburgh. *Man.*, H. E. Marriott. London Office, 8, King Street, E.C. *Man.*, C. E. M. Hudson .. .. .. P	1876	40/8	54/7	79/7	764,146
Scottish Provident, Life & Annuities, 6, St. Andrew Square, Edinburgh. *Man.*, J. G. Watson. *Joint Secs.*, J. Lamb and R. T. Boothby. *Asst. Sec.*, C. W. Thomson. *Act.*, W. G. Walton. London Offices, 3, Lombard Street, E.C., and 17, Pall Mall, S.W. M	1837	42/4	56/6	83/2	14,422 600
Scottish Temperance, Life, Sickness & Accident, 105, St. Vincent Street, Glasgow. *Manager*, Adam K. Rodger. London, 2, 3 & 4, Cheapside. *Man.*, W. A. Bowie. *Less 10 per cent to Whole Life Abstainers* P	1883	48/6	63/9	89/10	*1,425,516

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Title, Etc., of Office.	A	B	C	D	E
					£
Scottish Union & National, Fire, Life, Accident, Pensions, Annuities, etc., 35, St. Andrew Sq., Edinburgh. *Gen. Man.*, J. A. Cook. London Office, 3, King William Street, E.C. *Sec.*, James G. Nicoll P	1824	50/6	65/6	91/–	4,718,028
Scottish Widows' Fund, Life & Survivorship, 9, St. Andrew Square, Edinburgh. *Man. & Act.*, N. B. Gunn. *Sec.*, J. G. C. Cheyne. London Offices, 28, Cornhill, E.C., and 5, Waterloo Place, S.W. *Sec.*, R. Maclure. **Further particulars see page lxii** .. .. .. M	1815	51/9	66/3	90/7	19,550,615
Standard Life, 3, George Street, Edinburgh. *Man.*, Leonard W. Dickson. London Offices, 83, King William St., and 3, Pall Mall East. *Sec.*, J. H. W. Rolland P	1825	48/11	64/5	89/–	12,551,171
Star, Life, Annuities, Endowments, 32, Moorgate St., E.C. *Man. & Act.*, J. Douglas Watson, F.I.A. .. .. P	1843	48/9	64/11	90/6	6,596,644
Sun, Life, 63, Threadneedle Street, E.C. *Act.*, R. G. Salmon, F.I.A. *Sec. & Gen. Man.*, E. Linnell .. .. P	1810	49/2	66/6	94/2	8,029,066
Sun Life of Canada, Life and Annuities, Canada House, 4 & 5, Norfolk Street, W.C. *Man.*, J. F. Junkin .. .. P	1865	48/6	65/2	94/1	6,518,976
United Kingdom Temp., etc., Life, 196, Strand, W.C. *Sec.*, H. W. Hasler M	1840	48/10	64/11	90/6	*8,850,000
University, Life, 25, Pall Mall, S.W. *Act. & Sec.*, R. Todhunter, M.A P	1825	49/11	65/4	91/5	896,201
Wesleyan and General, Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. *Gen. Man. & Act.*, R. A. Hunt. London Office, 101, Finsbury Pavement, E.C. **Further particulars see page 832** .. .. M	1841	48/1	65/8	93/10	1,479,716
Yorkshire Limited, St. Helen's Square, York. London Office, 2, Bank Buildings, Princes Street. **Further particulars see page 824** P	1824	49/1	64/9	91/7	1,892,133

Medical Sickness and Accident, 33, Chancery Lane, W.C., *Sec.*, F. Addiscott, F.I.A., secure to registered members of the Medical Profession, and Licentiates of Dental Surgery in United Kingdom, a weekly allowance during incapacity from sickness or accident. Mutual. Established 1884. Assurance and Annuity Funds £240,000.

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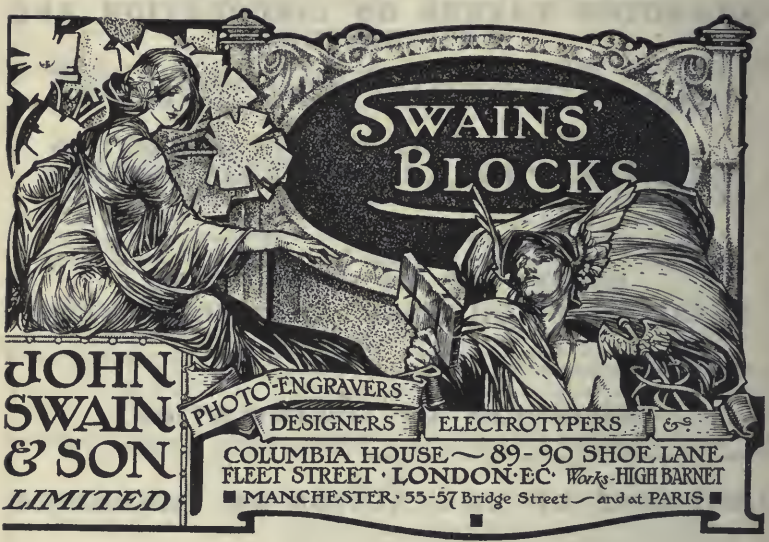

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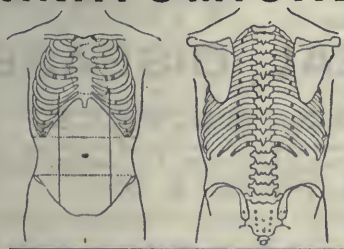

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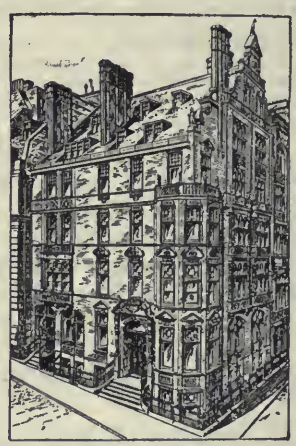

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To Students attending the Compton Burnett and the Honyman-Gillespie Lecture Course, or the latter exclusively, who may need assistance in the prosecution of their studies, the Lord Dysart has, for the current Session, generously offered Three Scholarships of £25 each. Lord Dysart has also offered One Scholarship of £50 and another of £25 to be awarded at the close of the Winter Session after examination.

For further information, application should be made to THE DEAN, LONDON HOMŒOPATHIC HOSPITAL, W.C.

UNIVERSITY OF MANCHESTER

FACULTY OF MEDICINE.

CURRICULUM.—Complete Courses of instruction are offered to Students (Men and Women) preparing for Degrees in Medicine and Surgery, and in Science, for Degrees and Diplomas in Public Health and Dentistry, and for Diplomas in Veterinary State Medicine, Psychological Medicine and Pharmacy, and for the qualifications of the Conjoint Board and other Licensing Bodies.

The University contains spacious and well equipped Laboratories in all departments of Science and Medicine. For Women Students a separate Laboratory for Practical Anatomy and Special Common Rooms are provided.

The Prospectus of the Medical Faculty and the special Prospectuses for the following departments: Dental, Public Health, and Pharmaceutical, will be forwarded on application to the REGISTRAR.

National Hospital Male Nurses' ASSOCIATION.

Fully-trained MALE NURSES and SKILLED MASSEURS supplied at the shortest Notice on application to the Lady Superintendent.

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ST. ANDREWS UNIVERSITY.

FACULTY OF MEDICINE.

THE SESSION, 1910–11, commenced OCTOBER 5th, 1910.

The whole Curriculum may be taken in Dundee, or the first two years of the Course may be taken in St. Andrews, and the remaining three years in the Conjoint School of Medicine, University College, Dundee. The various Laboratories are fully equipped for teaching and for research.

CLINICAL INSTRUCTION is given at the Dundee Royal Infirmary, which has 400 beds, with special wards for Maternity cases, Diseases of Women, Diseases of Children, Diseases of the Eye, Diseases of the Ear, Throat, and Nose, Diseases of the Skin, Cancer, Incipient Insanity, and for cases requiring electrical treatment. Further instruction in Diseases of the Eye is given at the Dundee Eye Institution, which is attended by over 4000 patients annually. Clinical Instruction in Fevers is given at the Municipal Fever Hospital; and clinical instruction in Mental Diseases at the Dundee District Asylum, which has about 400 resident patients.

APPOINTMENTS.—Five Resident Medical Assistants, and an Outdoor Obstetric Assistant, are appointed annually at the Dundee Royal Infirmary. At the District Asylum the appointments include two qualified Resident Medical Assistants and two Resident Clinical Assistants.

BURSARIES.—At United College, St. Andrews, a Malcolm Medical Bursary of the annual value of £25 and tenable for five years, is open to men or women. Fourteen Taylour-Thomson Medical Bursaries of the annual value of £20 to £30, are limited to women. At University College, Dundee, twelve Entrance Bursaries of the value of £15 each, and fourteen Second and Third Year's Bursaries of the value of £20 and £15, are open to competition. Two Fourth and two Fifth Year's Bursaries of £20 each are open to Students who take the Complete Curriculum in University College. Other Bursaries, of which the patronage is vested in trustees, are available.

THE FEES for the Complete Course, exclusive of Examination Fees, amount to about £120. For further information, apply to the Secretary, either at St. Andrews or in Dundee, or to

PROFESSOR KYNOCH, *Dean.*

UNIVERSITY COLLEGE, DUNDEE, *August*, 1910.

CHARING CROSS HOSPITAL

MEDICAL COLLEGE.

(UNIVERSITY OF LONDON.)

THIS COLLEGE IS COMPLETE IN ALL DEPARTMENTS.

Special Teachers for all Preliminary and Intermediate Subjects.

Eight Entrance Scholarships are awarded annually of the aggregate value of **£430.**

Twenty-two Hospital and Teaching **Appointments** are made yearly.

For Prospectus and details of fees apply to— FREDERICK C. WALLIS, *Dean.*

Royal College of Surgeons of Edinburgh

FOUNDED 1505.

Copies of the Regulations for the Fellowship, Licence, and Licence in Dental Surgery, with dates of Examinations, Curricula, etc., for the year 1910–11, are now ready, and may be had on application to—

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HONORARY MEDICAL STAFF.

Consulting Physicians—ARTHUR ORWIN, M.D.; PURVES STEWART, M.A., M.D., F.R.C.P.
Consulting Surgeon—Sir WATSON CHEYNE, Bart., C.B., F.R.S., F.R.C.S.
Consulting Ophthalmic Surgeon—A. STANFORD MORTON, F.R.C.S.
Surgeons—J. DUNDAS GRANT, M.A., M.D., F.R.C.S., attending Wednesday at 2.30 p.m., PERCY JAKINS, M.D., Monday at 2.30 p.m.; W. J. C. NOURSE, F.R.C.S.E., Tuesday at 5.30 p.m.; P. H. ABERCROMBIE, M.D., Thursday at 2.30 p.m.; W. STUART-LOW, F.R.C.S., Saturday at 2 p.m.; ANDREW WYLIE, M.D., Friday at 5 p.m.
Assistant Surgeons—JAMES ATKINSON, M.B., C.M., attending Monday at 2.30 p.m.; DAN. McKENZIE, M.D., F.R.C.S.E., Wednesday at 2.30 p.m.; J. GAY FRENCH, M.S., F.R.C.S., Friday at 5 p.m.
Pathologist—WYATT WINGRAVE, M.D., attending daily at 3 p.m.
Anæsthetists—W. H. GEORGE, M.R.C.S., L.R.C.P., attending Wednesday and Friday at 2 p.m.; J. BERESFORD KINGSFORD, M.D., Monday at 2 p.m. and Friday at 9 a.m.
Asst. Anæsthetists—J. D. MORTIMER, M.D., F.R.C.S., attending Tuesday and Wednesday at 9 a.m.; H. CRAMPTON, M.A., M.B., Tuesday at 2 p.m., Thursday at 9 a.m.
Dental Surgeon—WHISHAW WALLIS, L.D.S.R.C.S.
Asst. Dental Surgeon—HENNING JAMES, L.D.S.R.C.S. } attending Thursday at 10 a.m.

In addition to the In-patient department, the Hospital has a large Out-patient clinique which is open to Medical Practitioners and Students. Last year 726 In-patients were treated and 11,404 Out-patients were seen, involving nearly 53,000 separate attendances.

Operation Days: In-patients, Monday, Tuesday, Wednesday, Thursday, and Friday at 2 p.m.; Out-patients, Monday, Tuesday, Wednesday, Thursday, and Friday at 9 a.m.

Special Courses of Practical Demonstrations are given weekly on Tuesdays and Fridays during the Winter and Summer Sessions by the Members of the Staff. They are so arranged that practitioners joining at any time are enabled to complete the group of subjects in a course of six weeks. The fee for this course, with daily attendance at the Out-patients' department, is Three Guineas. The fee for general Clinical attendance is Five Guineas for three months, and Eight Guineas for six months. An Operative Surgery Course is held at intervals.

All information relating to Teaching arrangements can be obtained on application to the Dean, Dr. WYATT WINGRAVE.

RICHARD KERSHAW, *Secretary.*

UNIVERSITY of BRISTOL.

FACULTY OF MEDICINE.

THE Medical School affords complete courses of instruction for its own examinations, those of the University of London, and of the Conjoint Board, etc., for Medical Degrees or Diplomas. The Dental and Public Health Departments afford the necessary instruction for the Degrees and Diplomas of the University and other examining bodies in those subjects.

The University confers the following Degrees and Diplomas :—

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY	M.B., Ch.B.
DOCTOR OF MEDICINE	M.D.
MASTER OF SURGERY	Ch.M.
BACHELOR OF DENTAL SURGERY	B.D.S.
MASTER OF DENTAL SURGERY	M.D.S.
LICENTIATESHIP OF DENTAL SURGERY	L.D.S
DIPLOMA IN PUBLIC HEALTH	D.P.H.

The early part of the curriculum so interlocks with the curriculum for the B.Sc. that the Medical student may without much loss of time take also the degree of B.Sc. Moreover, the Dental Student may in seven years take both Dental and Medical Degrees. Magnificent Physiological and Chemical Departments have recently been opened, and new Laboratories have been provided for Mechanical Dentistry and Dental Metallurgy. The whole of the Dental Mechanical work for the Bristol Royal Infirmary is done in the University Laboratory by the students, instructed by a skilled mechanic.

CLINICAL WORK is done at the Bristol Royal Infirmary, the Bristol General Hospital, which together contain over 400 beds. The Bristol Royal Hospital for Sick Children and Women, the Bristol Eye Hospital, the Bristol City and County Asylum, and the Bristol City Fever Hospital are also open for the Clinical instruction of Students.

SCHOLARSHIPS.—There is no entrance scholarship, but students may, on their merits, receive financial aid from the General Scholarship Fund on application to the Scholarship Committee.

Several Scholarships and Prizes are open to students during their Hospital career.

HOSPITAL APPOINTMENTS open to students after qualification.

At the Bristol Royal Infirmary.—Two House Surgeons, two House Physicians (of these one is chosen as Senior Resident Officer), one Resident Obstetric Officer, one House Surgeon to the Ear, Nose and Throat Department, one Casualty Officer, and one Dental House Surgeon.

At the Bristol General Hospital.—One Senior House Surgeon, one House Surgeon, one House Physician, one Assistant House Physician, and one Casualty House Surgeon. All these appointments are salaried, with board and residence.

For further particulars and prospectus apply to the DEAN of the Medical Faculty or the Registrar.

UNIVERSITY OF DURHAM
COLLEGE OF MEDICINE, NEWCASTLE-ON-TYNE.

DEGREES IN MEDICINE, SURGERY, AND HYGIENE.—Six Degrees and two Diplomas are conferred by the University of Durham—*viz.*, the Degrees of Bachelor of Medicine, Doctor of Medicine, Bachelor of Surgery, and Master of Surgery; Bachelor of Hygiene, and Doctor of Hygiene; and the Diplomas in Public Health and Dental Surgery. These Degrees are open to Men and Women.

Attendance at the University of Durham College of Medicine during one of the five years of professional study, or subsequently to qualification elsewhere, is required as part of the curriculum for the Degrees, except in the case of Practitioners of more than fifteen years' standing, who have attained the age of forty years, who can obtain the Degree of M.D. after examination only.

The first three Examinations for the Degree of M.B. may be passed prior to the commencement of attendance at Newcastle.

A candidate who has passed the First and Second Examinations of the University will be exempt from the First and Second Examinations of the Conjoint Board in England, and will be entitled to present himself for the Final Examination of the Board on the completion of the necessary curriculum. Students who have satisfied the requirements of the General Medical Council as regards Registration, in some Examination other than the Durham Matriculation, or its equivalent, may enter on a course of study for a degree in Medicine upon satisfying the Examiners of the University of Durham in *three* of the subjects of the Matriculation Examination (exclusive of Religious Instruction and Elementary Mathematics), provided that one of them is a language other than English. In the case of a Student who spends only one year at Newcastle, the necessary subjects of the Matriculation Examination must be passed at least 12 months previously to the candidate's entry for his Final Examination for the Degree.

Students can complete, at the University of Durham College of Medicine, Newcastle-upon-Tyne, the entire course of professional study required for the above degrees and for the Diploma in Public Health; also for the examinations of the Royal Colleges of Physicians and Surgeons, and for the Army and Navy Examination Boards.

A Dental curriculum is provided, and a Diploma in Dental Surgery may be obtained after Examination.

All information, together with Examination Papers, etc., is given in the Calendar of the University of Durham College of Medicine, Newcastle-on-Tyne, which may be obtained gratis from the Secretary at the College.

Scholarships, &c.—University of Durham Scholarship, value £100 for proficiency in Arts awarded annually to full students in their first year only. The Pears Scholarship value £150—for proficiency in Arts. Dickinson Scholarship—value the interest of £400, and a Gold Medal—for Medicine, Surgery, Midwifery, and Pathology. Tulloch Scholarship—value the interest of £400—for Anatomy, Physiology, and Chemistry. Charlton Scholarship—value the interest of £700—for Medicine. Gibb Scholarship—value the interest of £500—for Pathology. Luke Armstrong Scholarship—interest on £680—for comparative Pathology. Stephen Scott Scholarship—interest on £1000—for promoting the study of Surgery and allied subjects. Heath Scholarship—the late George Yeoman Heath, M.D., M.B., D.C.L., F.R.C.S., President of the University of Durham College of Medicine, bequeathed the sum of £4000 to found a Scholarship in Surgery, the interest to be awarded every second year. Gibson Prize—value the interest of £225—for Midwifery and Diseases of Women and Children. The Turnbull Prize and Medal—for Surface Anatomy. The Goyder Memorial Scholarship (at the Infirmary)—value the interest of £325—for Clinical Medicine and Clinical Surgery. At the end of each Session, a Prize of Books is awarded in each of the regular Classes. Assistant Demonstrators of Anatomy, Prosectors, and Assistant Physiologists are elected yearly. Pathological Assistants, Assistants to the Dental Surgeon, Assistants in the Eye Department, Clinical Clerks and Dressers are appointed every three months.

The Royal Victoria Infirmary contains over 400 beds. Clinical Lectures are delivered by the Physicians and Surgeons in rotation. Pathological Demonstrations are given as opportunity offers, by the Pathologist; Practical Midwifery can be studied at the Newcastle Maternity Hospital, where there is an out-door practice of over 1000 cases annually.

FEES.

(*a*) A Composition Ticket for Lectures at the College may be obtained—
I.—By payment of 72 guineas on entrance.
II.—By payment of 46 guineas at the commencement of the First Year, and 36 guineas at the commencement of the Second Year.
III.—By three annual instalments of 36, 31, and 20 guineas respectively, at the commencement of the Sessional year.

(*b*) Fees for attendance on Hospital Practice:—
For 3 months' Medical and Surgical Practice, £6 6s. For 6 months' £10 10s. For 1 year's, £15 15s. For Perpetual, £36 15s.
Or by two instalments—First year, 20 guineas; Second year 18 guineas.
In addition to the above fees, the Committee of the Royal Victoria Infirmary require the payment of 2 guineas yearly up to three years from every Student attending the Infirmary for a year or part of a year. After three years of attendance, such payment will be no longer necessary.

(*c*) Single courses of Lectures, 5 guineas.

(*d*) A Composition Ticket for the courses of Lectures and Practical work of the first two years of the curriculum, may be obtained by the payment of 40 guineas on entrance.

(*e*) Composition fee for Lectures, etc., at College for Diploma in Dental Surgery, 34 guineas; Composition fee for Practical work at Dental Hospital, 35 guineas.

Fees for Lectures, etc., at the College must be paid to the Secretary. Fees for Hospital Practice to Dr. W. E. HUME, and fees for Practical Dental Work to the Dean of the Dental Hospital—at the time of entry.

Further particulars may be obtained from the Sec., PROF. HOWDEN, at the College.

UNIVERSITY OF EDINBURGH.

SESSION 1910-11.

Principal—Sir WILLIAM TURNER, K.C.B., D.C.L., LL.D., D.Sc., M.B.

The WINTER SESSION opens on the 4th of October and closes 15th March,
The SUMMER SESSION opens on 2nd May and closes 12th July.

FACULTY OF MEDICINE.

Dean—Professor HARVEY LITTLEJOHN, M.A., B.Sc., M.B., C.M.

The Faculty embraces thirteen Chairs and eighteen Lectureships; and attached to these Chairs there are about thirty assistants and Demonstrators. Instruction is given in all the main branches of Medical Science, viz.,

PROFESSORS.

Chemistry—James Walker, D.Sc., F.R.S.
Zoology—J. Cossar Ewart, M.D.
Botany—Isaac Bayley Balfour, M.D., D.Sc.
Anatomy—Arthur Robinson, M.D., C.M.
Physiology—E. A. Schafer, LL.D.
Materia Medica—Sir Thomas R. Fraser, M.D. LL.D.
Pathology—William S. Greenfield, M.D.
Forensic Medicine—Harvey Littlejohn, M.B., B.Sc.
Public Health—C. Hunter Stewart, M.B., D.Sc.
Medicine—John Wyllie, M.D., LL.D.
Surgery—Alexis Thomson, M.D., C.M., B.Sc.
Midwifery—Sir J. Halliday Croom, M.D.
Clinical Surgery—Francis Mitchell Caird, M.B., C.M.
Clinical Medicine—Sir Thomas R. Fraser, M.D. Wm. S. Greenfield, M.D., John Wyllie, M.D.

UNIVERSITY LECTURERS.

Mental Diseases—George M. Robertson, M.B., C.M.
Diseases of the Eye—George Mackay, M.D.
Systematic and Clinical Gynæcology—A. H. F. Barbour, M.A., M.D.
Clinical Instruction on Diseases of Children—G. H. Melville Dunlop, M.D., and Staff of Royal Hospital for Sick Children.
Embryology and Vertebrate Zoology—J. Beard, D.Sc.
Anatomy—E. B. Jamieson, M.D.
Applied Anatomy—Harold J. Stiles, M.B., C.M.
Histology—Harold Pringle, M.D.
Physiological Chemistry—W. Cramer, Ph.D. D.Sc.
Experimental Physiology—W. T. A. Jolly, M.B., Ch B.
Experimental Pharmacology—W. C. Sillar, M.D., B.Sc.
Physics—C. G. Knott, M.A., D.Sc.
Pathological Bacteriology—W. E. Carnegie Dickson, M.D., B.Sc.
Diseases of the Larynx, Ear and Nose—A. Logan Turner, M.D.
Tropical Diseases—D. G. Marshall, Major, I.M.S.
Medical Entomology, and Protozoology—J. H. Ashworth, D.Sc.
Tropical Hygiene—J. B. Young, M.B., D.Sc., conjointly with Professor.
Diseases of the Skin—Norman Walker, M.D.
Clinical Instruction in Infectious Fevers—Alexander James, M.D.; Claude B. Ker, M.D.
Practical Anæsthetics—D. C. A. McAllum, M.B., C.M.
History of Medicine—J. D. Comrie, M.A., B.Sc., M.B.

Practical Instruction is afforded, under the superintendence of the Professors, in Laboratories with the necessary appliances, and in Tutorial and Practical Classes connected with the above Chairs, and opportunities are afforded to Students and Graduates to extend their practical knowledge and engage in original research.

Opportunities for Hospital Practice are afforded at the Royal Infirmary, the Hospital for Sick Children, Maternity Hospital, the City Fever Hospital, and Asylum for the Insane. Upwards of 2,106 beds are available for the Clinical Instruction of Students of the University.

Four Degrees in Medicine and Surgery are conferred by the University of Edinburgh, viz., Bachelor of Medicine (M.B.), Bachelor of Surgery (Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.); and Diplomas in special branches of Medical and Surgical Practice may also be conferred on Graduates in Medicine and Surgery of the University.

The minimum Class Fees for M.B. and Ch.B., including Hospital Fee (£12), amount to about £115, and the Matriculation and Examination Fees to £28 7s. An additional Fee of £10 10s. is payable by those who proceed to M.D., and £10 10s. by those who proceed to Ch.M.

The Annual value of the Bursaries, Prizes, Scholarships, and Fellowships in the Faculty of Medicine amounts to about £3,600, and that of the other Bursaries, &c., tenable by students of Medicine, amounts to about £1,820.

Instruction is also given in Public Health, and the Degrees of B.Sc. and D.Sc. in Public Health are conferred by the University.

Residences for Students, Graduates, and others, situated within easy reach of the University, afford excellent board and lodgings on very moderate terms.

A Syllabus and further information as to Matriculation, the Curricula of Study for Degrees, &c., may be obtained from the Dean of the Faculty of Medicine, and for Degrees in the Faculties of Arts, Science, Divinity, Law and Music, from the Deans of these Faculties; or from the Clerk of Senatus; and full details are given in the University Calendar, published by James Thin, 55, South Bridge, Edinburgh. Price by post, 3s. 6d.

The Preliminary and Degree Examination Papers in each of the Faculties are also published by Mr. James Thin—viz., Arts and Science Preliminary Papers and Bursary Papers, 1s.; Medical Preliminary Papers, 6d.; Degree Papers—Arts, 1s.; Science, 9d.; Divinity, Law, Medicine, and Music, 6d. each.

By Authority of the Senatus.

October, 1910. L. J. GRANT, *Secretary of Senatus.*

ROYAL INFIRMARY
EDINBURGH.

IN this Hospital (with over 900 beds in use) a portion of the beds is set apart for Clinical Instruction by the Professors of the University of Edinburgh. Courses of Clinical Medicine and Surgery are also given by the ordinary Physicians and Surgeons. Three Wards are specially set apart for the Clinical Instruction of Women Students. Special Instruction is given in the Medical Department on the Diseases of Women, Physical Diagnosis, and Diseases of the Skin; and in the Surgical Department on Diseases of the Eye, the Ear, and the Larynx. Separate Wards are devoted to Venereal Diseases, Diseases of Women, and Diseases of the Eye, Ear and Throat, and Skin, also to cases of Incidental Delirium or Insanity. Post-mortem Examinations are conducted in the Anatomical Theatre by the Pathologist, who also gives practical instruction in Pathological Anatomy and Histology.

MEDICAL DEPARTMENT.

Consulting Physicians—Dr. J. O. Affleck; Dr. Andrew Smart; Dr. Alex James.
Consulting Gynæcologists—Professor Sir J. Halliday Croom; Emeritus Professor Sir A. R. Simpson.
Consulting Physician for Diseases of the Skin—Dr. Allan Jamieson.
Professors of Clinical Medicine—Sir T. R. Fraser; Dr. W. S. Greenfield; Dr. John Wyllie.
Ordinary Physicians and Lecturers on Clinical Medicine—Dr. Byrom Bramwell; Dr. Geo. A. Gibson; Dr. Alexander Bruce; Dr. R. W. Philip; Dr. William Russell.
Gynæcologists—Dr. A. H. F. Barbour; Mr. N. T. Brewis.
Physician for Diseases of the Skin—Dr. Norman Walker.
Assistant Physicians—Dr. G. Lovell Gulland; Dr. J. J. Graham Brown; Dr. Francis D. Boyd; Dr. R. A. Fleming; Dr. Harry Rainy; Dr. Chalmers Watson; Dr. Edwin Bramwell; Dr. Edwin Matthew.
Assistant Gynæcologists—Dr. J. Haig Ferguson: Dr. Wm. Fordyce.
Assistant Physicians for Diseases of the Skin—Dr. Frederick Gardiner; Dr. R. Cranston Low.
Medical Electrician—Dr. Dawson Turner.
Assistant Medical Electrician—Dr. W. Hope Fowler.

SURGICAL DEPARTMENT.

Consulting Surgeons—Mr. Joseph Bell; Mr. A. G. Miller; Dr. P. H. Maclaren; Dr. C. W. MacGillivray; Emeritus Professor John Chiene, C.B.
Consulting Ophthalmic Surgeon—Mr. George A. Berry.
Consulting Aural Surgeons—Dr. P. McBride; Dr. R. McKenzie Johnston.
Consulting Dental Surgeon—Mr. William Guy.
Regius Professor of Clinical Surgery—Mr. Caird.
Professor of Surgery—Mr. Alexis Thomson.
Ordinary Surgeons—Mr. J. M. Cotterill; Mr. Chas. W. Catheart; Mr. Hodsdon; Mr. David Wallace; Mr. Alexander Miles.
Ophthalmic Surgeons—Dr. George Mackay; Dr. Wm. George Sym.
Surgeons to Ear and Throat Department—Dr. A. Logan Turner; Dr. J. Malcolm Farquharson.
Dental Surgeon—Mr. J. H. Gibbs.
Assistant Surgeons—Mr. John W. Dowden; Mr. A. A. Scot-Skirving; Mr. George L. Chiene; Mr. W. J. Stuart; Mr. J. W. Struthers; Mr. Henry Wade; Mr. E. Scott Carmichael.
Assistant Ophthalmic Surgeons—Dr. J. V. Paterson; Dr. A. H. H. Sinclair.
Assistant Surgeons to Ear and Throat Department—Dr. John S. Fraser; Dr. John D. Lithgow.
Pathologist—Dr. Theodore Shennan.
Assistant Pathologists—Dr. James Miller; Dr. A. Murray Drennan.
Superintendent—Colonel W. P. Warburton, M.D., C.S.I.

HOSPITAL TICKETS—Perpetual Ticket, in one Payment, £12; Annual Ticket, £6 6s.; Six Months, £4 4s.; Three Months, £2 2s.; One Month, £1 1s. Separate Payments amounting to £12 12s. entitle the Student to a Perpetual Ticket, on production of previous Season Tickets.

APPOINTMENTS.

No fees are charged for any of the Medical or Surgical Appointments to this Hospital, which are as follows:—

1. Resident Physicians and Surgeons, who must be registered as legally qualified Practitioners, are from time to time appointed by the Managers, on the recommendation of the Physicians and Surgeons. The holders of these offices live in the House free of charge. The appointment is for six months, but may be renewed at the end of that period by special recommendation.

2. Non-Resident Physicians and Surgeons or Clinical Assistants, who must also be registered as legally qualified Practitioners, are appointed by the Managers on the recommendation of the Physicians and Surgeons. The appointment is on the same terms as that of Resident Physicians and Surgeons.

3. Clerks and Dressers are appointed by the Physicians and Surgeons. These appointments are open to all Students and Junior Practitioners holding Hospital Tickets.

4. Assistants in the Pathological Department are appointed by the Pathologists.

WILLIAM S. CAW, *Treasurer and Clerk.*

Richmond, Whitworth and Hardwicke Hospitals, DUBLIN.

THE SESSION 1910-11 commenced on October 1st, 1910. These Hospitals for Surgical, Medical and Fever cases respectively, contain nearly 300 beds.

Physicians: Doctors O'Carroll, Coleman and Travers-Smith. **Assistant Physicians:** Doctors Matson, Purser, and Nesbitt.
Surgeons: Sir Thomas Myles, Mr. R. J. Harvey, Mr. Conway Dyer. **Assistant Surgeons:** Mr. Slattery, Mr. McConnell, Mr. Crawford. **Consulting Surgeon:** Sir Thornley Stoker.
X Rayist: E. J. M. Watson.
Ophthalmic Surgeon: Mr. Joyce. **Gynæcologist:** Dr. Wilson.
Laryngologist: Mr. Gogarty. **Pathologist:** Dr. Earl.
Unqualified resident clinical clerks are appointed quarterly from any recognised school of medicine.

For Particulars apply to
R. TRAVERS SMITH, M.D., 20 Lower Fitzwilliam Street, Dublin, *Hon. Sec. and Treasurer.*

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Rich Foundations. Numerous Scholarships from £90 a year to Universities. School Scholarships of £30 a year. Tuition fee £15 a a year. Boarding fee £47. No Extras.

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Principal: MRS. WILSON (Trained in Sweden)
Instructress at St. Bartholomew's Hospital, E.C.

THOROUGH TRAINING **SWEDISH SYSTEM.** Massage, Medical Gymnastics, Anatomy, Physiology, Electricity. Practical work on Patients sent to CLINIQUE by Medical Men; and at St. Bartholomew's Hospital where Mrs. WILSON'S Pupils work under her supervision.

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For Prospectus apply to Secretary—

211 GREAT PORTLAND ST., LONDON, W.

Glasgow Royal Infirmary.

THE WINTER SESSION opened on October 17th, 1910. Number of Beds, including the Ophthalmic Department, is 620.

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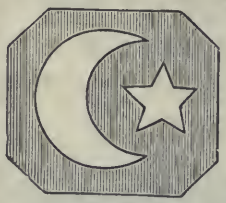

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Chaplain: REV. C. C. NATION, M.A. (Vicar of Buxton and Rural Dean).

THIS Institution has been established for the **Reception of Patients of Both Sexes of the Higher and Middle Classes**, for whom it is admirably adapted by its position and appointments. It is erected on an eminence surrounded with scenery of the most varied character, and the views from the House and Terraces extend over many miles of picturesque country. There is also in connection a Summer Residence on the coast of North Wales. The House is furnished throughout on the most liberal scale, and fitted up and arranged as a Gentleman's Family Residence. Voluntary Boarders can be received.

The Sanitary arrangements and Ventilation are modern in design and *perfect* in construction, and are certified to be so by the Sanitary Authority.

The Medical Superintendent lives in the House, and is assisted in his duties by two Assistant Physicians, and an experienced Lady Superintendent.

Every exertion is made to promote health and comfort, both by moderate bodily employment and by variety in amusements, such as reading, music, drawing, excursions, golf, billiards, croquet, lawn tennis, theatricals, re-unions, etc. A library is provided, containing some 2,000 works of varied character, suited to the condition of the patients; also periodicals, magazines, and newspapers. Motor exercise is provided.

Due provision is made for the spiritual welfare and consolation of the Patients, and Divine Service is held every Sunday in the Institution.

The Pleasure Grounds, which are very spacious, have been laid out in the most tasteful manner especially for the recreation of the Patients; and contain conservatories, lawns for croquet and tennis, a private golf course, and other out-door games; also a theatre, two billiard rooms, and workshop for the in-door occupation of Patients. The House is heated throughout by means of hot-water apparatus and open fireplaces.

Buxton is directly accessible by the Midland and the L. & N.W. Railways. It is situated on the mountain limestone formation, 1000 feet above sea level. Being a watering-place, it affords exceptional advantages and varied recreations to convalescent Patients.

Particulars of Terms and Forms of Admission on application to THE MEDICAL SUPERINTENDENT.

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FOR THE

Treatment of Mental Diseases.

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Visiting Physician:

T. R. GLYNN, M.D., F.R.C.P.Lond.,
Consulting Phys. Liverpool Infirm., & Prof. of Med. Univ. Coll. Liverpool.

Consulting Surgeon:

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THIS House, specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen mentally afflicted, is delightfully situated near the coast between Liverpool and Southport, so that patients have the benefit of pure bracing sea air, for which Formby is noted. The House is in the country, and stands in several acres of ornamental well-wooded grounds, the surroundings being in every way bright, cheerful and pleasant. As the Licensees reside on the premises they are able to devote the whole of their time to the constant supervision of the patients. All kinds of out-door and in-door amusements and occupation provided. Voluntary Boarders without certificates admitted.

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THIS PRIVATE ASYLUM, which was founded by the late W. H. O. SANKEY, M.D., F.R.C.P., for the reception of a limited number of

Ladies and Gentlemen MENTALLY AFFLICTED,

is now conducted on the same lines by his son, E. H. O. SANKEY, M.A., M.B., B.C. Cantab.

The Ladies' Division is directly supervised by Mrs. SANKEY.

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The Asylum is situate about ten miles from Shrewsbury, within easy distance of Baschurch Station, G.W.R., whither carriages can be sent at any time for visitors.

Letters and Telegrams should be addressed to—

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THE RETREAT, YORK. *ESTABLISHED 1792.*

A Registered Hospital for the Treatment of Mental Diseases.

Under the management of a Committee of Members of the Society of Friends. Situated about two miles from York Station. The Patients are derived from the **Upper and Middle Classes**, and none are paupers or rate-aided. **Terms from 48/- weekly.**

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For further particulars as to the resources of the Institution, and information respecting the admission of Patients, see the Annual Report, which will be sent on application to Dr. BEDFORD PIERCE, the Medical Superintendent. *Nat. Telephone:* **112 York.**

THROXENBY HALL, Near SCARBOROUGH.

A Branch House connected with The Retreat, York, situated near the Raincliffe Woods, about two miles from Scarborough, for the reception of **Convalescent Patients**, also for the treatment of persons suffering from **Incipient or Mild Forms of Mental Disorder** who cannot be certified as of unsound mind, and who wish voluntarily to place themselves under skilled treatment.—For further particulars apply to the Matron, or to Dr. BEDFORD PIERCE, at THE RETREAT, YORK. *Nat. Telephone:* **282 Scarborough.**

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THIS Institution is an endowed Hospital, registered under the Lunacy Acts, and managed by a Board of Governors who have no pecuniary interest in its success, but whose sole object is to promote the comfort and well-being of the Patients.

The Hospital is arranged for both sexes, and is especially adapted for those whose means will not permit of their being sent to an expensive and luxurious Institution for the Insane, and who may object to the associations of a pauper asylum.

The terms for admission are **thirty shillings per week or more,** according to Patients' condition and circumstances, which includes everything, except clothing, carriage exercise, or any expenses incurred for amusement beyond the Hospital grounds.

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SAMUEL J. BARTON, Esq., M.D.
(Consulting Physician to the Norfolk and Norwich Hospital).

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A Home for private patients in a detached Villa, in connection with the County Asylum at Lancaster, but apart from the pauper department. **Terms** from **21/-** per week, without extras.

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TWO VILLAS have just been erected, one for each Sex. The furnishing and general equipment is in every respect up to date; nothing has been overlooked that is calculated to add to the comfort and happiness of the inmates.

Patients can be received at the rate of **£35** per annum.

For further particulars apply to - **"THE SUPERINTENDENT."**

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Including separate bedrooms for all suitable cases.

Vacancies are advertised each week in the *British Medical Journal* and the *Lancet.*

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Extensive arrangements are made in this Asylum for the reception of PRIVATE PATIENTS of BOTH SEXES. *Terms from* **25**/- *per week.*

Further particulars can be obtained upon application to the
RESIDENT PHYSICIAN.

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DORCHESTER ASYLUM.

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ACCOMMODATION is provided for PRIVATE PATIENTS in the Hospital at £1 4s. 6d. per week, and in addition two wards of the Main Building have been set aside for the same purpose, at a reduced charge of One Guinea per week for each person from the Administrative County of East Sussex, and £1 2s. 9d. for each person from outside the County, to include all things necessary except clothing.

The main and detached building of this new Institution have been built on the most modern principles, and everything possible has been done to ensure the comfort and cure of those mentally afflicted.

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For particulars apply to the MEDICAL SUPERINTENDENT.

Telegrams: "ENVOY, LONDON." Telephone: 5608 Central.

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For Mental Diseases,

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A REGISTERED HOSPITAL FOR MENTAL DISEASES, situated in the City of Lincoln, near to the Cathedral.

FOR TERMS, APPLY TO

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This Home has been established over fifty years for the Care and Treatment of Ladies suffering from Mental Ailments.

TERMS, Etc., on application to—

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BETHLEM ROYAL HOSPITAL

ARE PREPARED TO RECEIVE A LIMITED NUMBER OF PATIENTS AT TWO GUINEAS A WEEK, INCLUSIVE.

All particulars may be obtained from the Resident Physician, or the Steward of the Hospital.

ST. GEORGE'S ROAD,
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HOMES for the CARE and TREATMENT of THE MENTALLY AFFLICTED.

For Ladies—

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The Home stands in large grounds close to West Kensington Station.

For Terms, apply to MRS. CHAPMAN, Resident Lady Superintendent.
National Telephone: Hammersmith 1004.

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NEWLANDS HOUSE

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—Tooting, S.W.—

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For Terms, apply to the Res. Med. Supt. HENRY J. HIND, M.R.C.S.
National Telephone: Streatham 524.

A. H. SUTHERLAND (Licensed Proprietor), 2a, Marloes Road, Kensington, W.

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FOR THE INSANE OF BOTH SEXES.

—— *Terms on application.* ——

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Near DARTFORD, KENT.

PRIVATE PATIENTS are received from **£1 1s.** per week for each person, and **£2 2s.** per week for Ladies in HILL HOUSE, to include all things necessary except clothing.

The Institution is situated on an elevated site between Dartford and Greenhithe, and is about sixteen miles from London on the S.E.R. It has been recently remodelled, renovated, and lighted by electricity throughout. The Estate comprises 207 acres.

Cricket, Football, Hockey, Golf, Tennis, Billiards, Dances, Theatricals, and other amusements are amply provided.

For particulars apply to **Medical Superintendent, STONE HOUSE, near DARTFORD.**

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Private Villas, in suites of rooms.

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For further particulars apply to RESIDENT PHYSICIAN.

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An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of forty acres in extent, with a surrounding country noted for the beauty of its walks and drives. The climate is genial and bracing. Occupation, indoor and outdoor amusements, and carriage and other exercise amply provided.

TERMS range from **3** to **7** guineas per week, inclusive, according to requirements as to accommodation, special attendance, etc.

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FOR FURTHER PARTICULARS APPLY TO THE MEDICAL SUPERINTENDENT.

St. George's Retreat, Burgess Hill, Sussex.

THIS PRIVATE ASYLUM is under the Management of Augustinian nuns. It receives Lady Patients only, who are under the immediate care of the Sisters. A Chaplain and a Medical Man reside in the house, and the Patients are also visited regularly by a physician of special experience. The establishment is supplied with every requisite for the treatment and well-being of the Patients; and the grounds (of 280 acres) in which it stands afford ample space for their recreation and exercise. It is within two miles of Burgess Hill Station, on the London and Brighton Railway, and is easily accessible from all parts of the kingdom.

For particulars and terms apply to **THE REV. MOTHER SUPERIOR, ST. GEORGE'S RETREAT.**

Slight Mental Defect.

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Conducted by THE CO-OPERATIVE SANATORIA Ltd.

FOR GENTLEMEN NOT ILL ENOUGH FOR ASYLUM TREATMENT. Grounds 15 acres. Facilities for Carpentry, Gardening, and Farm work.

INCLUSIVE TERMS - **16/-** TO **42/-** WEEKLY.

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A REGISTERED HOSPITAL for PRIVATE PATIENTS Only, of the UPPER and MIDDLE CLASSES.

ARRANGED and furnished with all the most approved appliances for the treatment, comfort, and amusement of the Inmates. Within two miles of the Railway Station, and easily accessible by Rail from London and all parts of the kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of 250 acres. *For terms, etc., apply to—*

JAS. GREIG SOUTAR, M.B., C.M., *Resident Superintendent.*

PLYMPTON HOUSE,
PLYMPTON, SOUTH DEVON
ESTABLISHED 1834.

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the medical treatment and care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.

The proprietor, Dr. ALFRED TURNER, has had very large experience of Mental cases, both in public and private institutions, and everything that can be done to ameliorate the condition of the chronic, and promote the cure of the acute cases—placed under his charge—is guaranteed.

Terms on application. *Letters and Telegrams:*

Telephone No. 2 PLYMPTON. DR. TURNER, PLYMPTON.

CAMBERWELL HOUSE
33, PECKHAM ROAD, LONDON, S.E.

Telephone: No. HOP. 1037. Telegrams: "PSYCHOLIA, LONDON."

For the Care and Treatment of those of Both Sexes suffering from NERVOUS and MENTAL DISORDERS.

CONSISTS of separate Houses, lit by electricity and completely modernised, standing in 20 acres of picturesque grounds, including cricket and football field, tennis court, and croquet lawns. The Terrace Houses are quite separate from the rest of the Institution, and are specially adapted for the reception of Mild and Borderland Cases, who can enter voluntarily.

The ordinary Terms are **2 guineas** per week. Patients can have separate sitting and bedrooms, with a special nurse, as well as the use of the general rooms, and a change to the Seaside Annexe at BRIGHTON.

For further particulars apply to the MEDICAL SUPERINTENDENT at the above address.

THE WARNEFORD,

HEADINGTON HILL, OXFORD.

A Registered Hospital for the Care and Treatment of both Sexes of the Upper and Middle Classes, when suffering from Nervous and Mental Disorders.

President—THE RIGHT HON. THE EARL OF JERSEY.
Chairman of the Committee—
THE REV. WILLIAM ARCHIBALD SPOONER, D.D., Warden of New College, Oxford.
Vice-Chairman—SURGEON-GENERAL BRADSHAW, C.B.

The Regular Charge for Patients is **£2 2s.** a week, but the Committee have power to alter the charges at their discretion, as the circumstances of cases require.

The building is arranged, so far as is compatible with the requirements of a Mental Hospital, in the manner of an ordinary private residence.

The Hospital possesses an Endowment Fund, arising from numerous grants of the late Dr. SAMUEL WILSON WARNEFORD and others. When a reduction of the ordinary charge is asked, a special statement of the circumstances of the Patient must accompany the application for Admission.

For further particulars, apply to the Medical Superintendent, JAMES NEIL, M.D.

THE GRANGE, Near ROTHERHAM,

A SANATORIUM OF THE HIGHEST CLASS FOR THE

CARE & CURE OF MENTAL INVALIDS (LADIES).

Consulting Physician: CROCHLEY CLAPHAM, M.D., F.R.C.P.E.
Resident Physician: G. E. MOULD, M.R.C.S. Eng., L.R.C.P. Lond.
Physician for Mental Diseases to the Sheffield Royal Hospital.

THE House is a spacious Family Mansion, with extensive pleasure grounds, including good Croquet and Tennis Grounds, and an immense Park, containing Private Drives and Walks of several miles in extent. It is situated in the heart of the famous Robin Hood Country (5 miles from Sheffield, 4 from Rotherham), and is surrounded by beautiful scenery, and an atmosphere free from smoke and impurity. Situation dry and healthy. The arrangements are of a domestic character. The Proprietors welcome visits from the usual Medical Attendant of the Patient during her residence. Under the New Act Voluntary Patients can be received, without Certificates, on own personal application. The Rev. R. T. C. SLADE, Mus. Bac., Vicar of Thorpe-Hesley, acts as Chaplain, and conducts regular Services.

The Resident Physician may be seen at the Grange; or at Leavygreave House, Hounsfield Road, Sheffield, by appointment. (Nat. Tel. No. 34, Rotherham.)

GRANGE LANE STATION (M. S. & L. Railway) is within a quarter of a mile of The Grange, and may be reached via Sheffield or Barnsley direct; or via Rotherham, changing at Tinsley

FOR TERMS, FORMS, &C., APPLY TO THE RESIDENT PHYSICIAN.

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A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

Situated in a large Park, 300 feet above sea level, in a healthy and picturesque locality, easily accessible from London, Bristol, and Cardiff by Winterbourne Station; or from Fishponds, Yate, or Patchway Stations.

Voluntary Boarders received without Certificates.

For further information, see London Medical Directory, p. 2087, and for Terms, etc., apply to Dr. EAGER, or Dr. J. D. THOMAS, Resident Medical Proprietors, Northwoods House.

Dr. EAGER *or* Dr. THOMAS *attends at* 64, *PARK STREET, BRISTOL, on Mondays and Thursdays, from* 12 *to* 3 *o'clock.*
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NEAR GLASGOW.
FOR LADIES.

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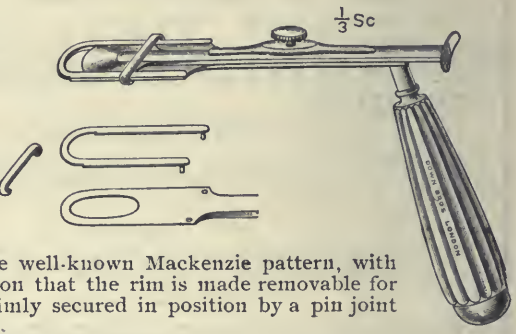

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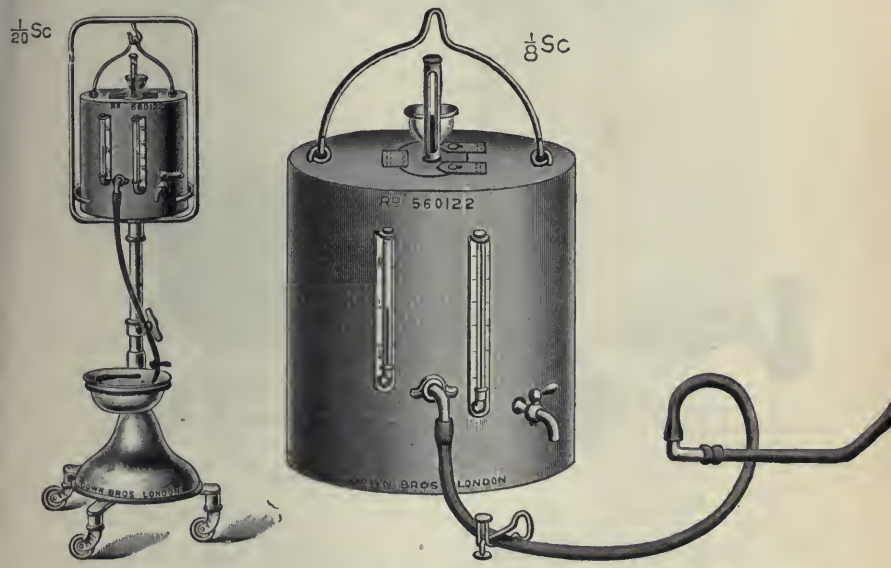

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The hot-water jacket maintains the temperature for about one hour, and can then be easily replenished by means of the funnel and tap.

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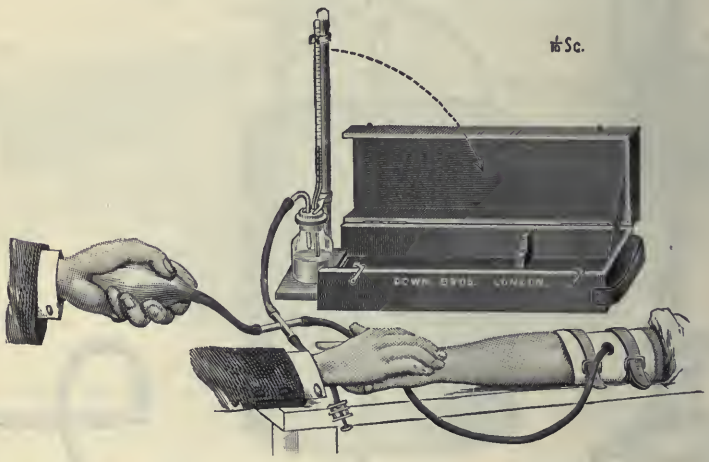

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WEIGHT—
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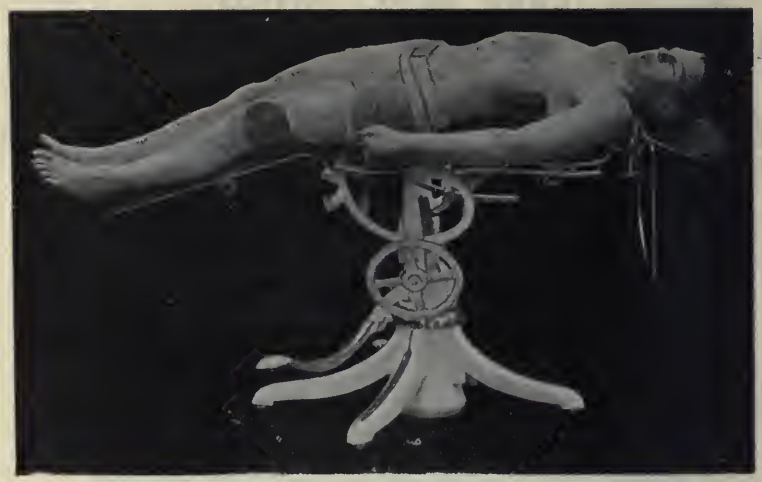

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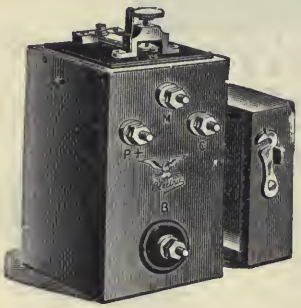

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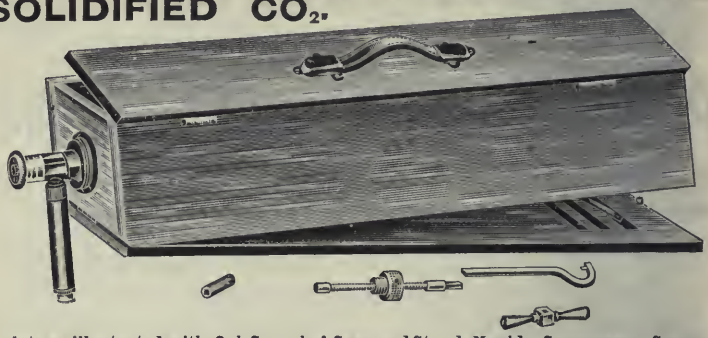

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By means of this new apparatus harder sticks of Solid CO_2 can be produced than with any other apparatus on the market. By means of a screw device, the snow when formed is subjected to a pressure of several thousands of pounds, producing harder and colder pencils, lasting longer than the loosely made pencils obtained with other makes of apparatus. The chamber in which the snow is made is fitted with an insulating sleeve; when detached from the cylinder, it forms a very suitable applicator for holding the pencil of CO_2 applied to the patient. The pencils are so solid that when dropped in a vessel of water they immediately sink, whereas the pencils made without our compressor will be found to float.

The following conditions can be successfully treated with solid CO_2—NAEVI, PAPILLOMA, RODENT ULCER, TRACHOMA, LUPUS.

Dr. REGINALD MORTON, *British Medical Journal*, Oct. 29th, 1910

"After having made over 1,000 applications with solid CO, the way in which Papillomata, Naevi, and Rodent Ulcer disappeared after this treatment continued to surprise me. I would not have believed such results possible, had I not seen them myself."

Dr. Morton has treated over 2'0 cases of Capillary Naevi with *90 per cent cures* at the *first application.*

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PRICES (Post Free in British Isles).

Feet Inches	Each	Feet Inches	Each	Feet Inches	Each
5 by 2½ wide	3/3	21 by 2½ wide	10/6	10½ by 3 wide	6/9
7½ by 2½ ,,	4/3	5 by 3 ,,	3/9	15 by 3 ,,	9/3
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Small WRIST BANDAGE, 3 ft. by 1½ inch wide, each 1/-

Air and Water Beds and Cushions, Bed Sheets, Urinals, Ice Caps, Hot-Water Pillows. LISTS POST FREE.

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(PATENT APPLIED FOR,)

Fig. 1

For use over Fire and Gas Burner.

1. **Cheap and Simple.**
2. **Efficient for Dressings and Instruments.**
3. **Dressings made perfectly Dry and Aseptic.**
4. **The small amount of steam evolved allows its use in any room.**

Fig. 2

Germs are all destroyed in less than half an hour. All that is necessary is to pour in requisite amount of water, place in dressings, adjust lid, and set on gas-ring, fire, or other heating apparatus.

No. 1—Polished copper, tinned inside, internal dimensions of sterilizer, 6¾ in. deep by 6¼ in. diam. Complete, with nickel-plated copper drum, size 6¼ in. by 6 in., each ..	£2 17 6
Ditto, ditto, ditto nickel-plated, each	£3 3 0
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Metal stand, with gas ring for above	£0 17 6
No. 2—Polished copper, tinned inside, internal dimensions, 9¾ in. deep by 9¼ in. diam. Complete with one nickel-plated drum, size 9 by 9 in., each	£4 10 0
Ditto, ditto, ditto nickel-plated, each	£4 17 6
No. 2A—Ditto, ditto, internal dimensions 20 in. deep by 9¼ in. diameter. Complete with two drums, 9 in. by 9 in., each	£7 10 0
Ditto, ditto, ditto nickel-plated, each	£8 10 0
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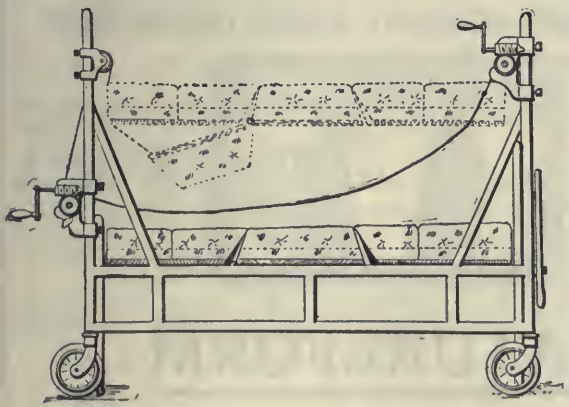

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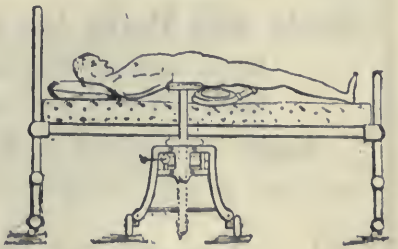

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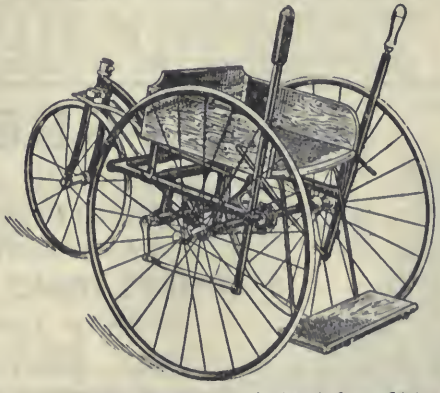

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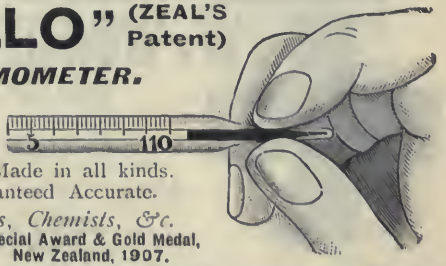

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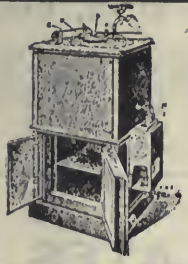

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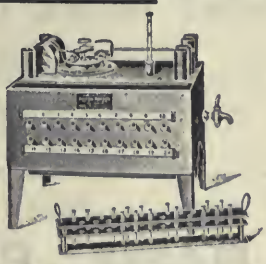

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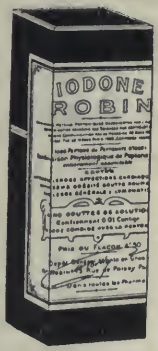

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